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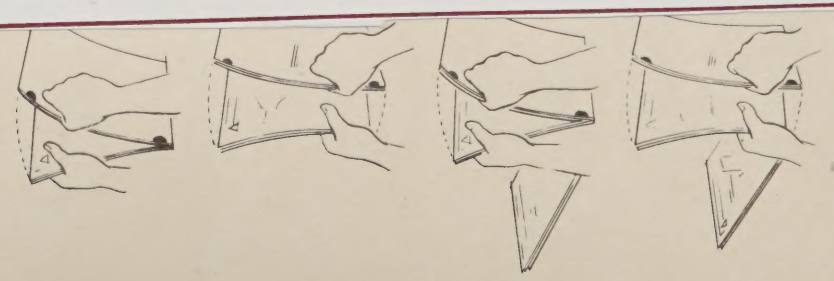

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The PHOTOFACT Servicer

FEBRUARY 2, 1948 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ VOL. 4, No. 33

ROBERT M. ELLIS, *Editor*

INDUSTRY RECOGNITION TO HOWARD W. SAMS

On January 12, 1948, at the P.R.S.M.A. Charter Banquet in Philadelphia, Howard W. Sams received the singular honor of being awarded a silver plaque for his work in bettering conditions of the radio service business. This plaque carries the following inscription—

"THE FEDERATION OF RADIO SERVICE MEN'S ASSOCIATIONS OF PENNSYLVANIA AWARD TO HOWARD W. SAMS IN RECOGNITION OF HIS OUTSTANDING EFFORTS IN BEHALF OF THE RADIO SERVICE INDUSTRY 1947."

The award was accepted by Mr. Sams "in behalf of his gang who made it all possible."

Other awards were made in the form of life memberships in the P.R.S.M.A. to Harry Kalker of Sprague, and Bob Baggs of the Harry P. Bridge Company, formerly with IRC.

The "Charter Banquet" at which the awards were made was held in celebration of the victory of a campaign for recognition of their service organization; and means that the Philadelphia Radio Service Men's Association now has the full legal recognition by the city fathers.

The P.R.S.M.A. is a member of the Federation of Radio Service Men's Association of Pennsylvania, who at a meeting some time ago decided that something should be done to honor those who had helped the service profession; and as a result, they will present an annual award, the first of which has gone to Mr. Sams. The "Charter Banquet" was held during the "Town Meeting of Radio Technicians Program" at the Bellevue-Stratford Hotel in Philadelphia, January 11, 12 and 13, sponsored by the Radio Parts Industry Coordinating Committee. Approximately 1,100 service technicians from eleven states east of the Mississippi, and from approximately twenty-two local and state organizations attended the meetings.

Announcing "THE HOWARD W. SAMS' RADIO RECEIVER TUBE PLACEMENT GUIDE"

This book, like all Howard W. Sams' Publications, answers an important, everyday need. It was prepared in response to the thousands of requests you sent us for such a publication.

The purpose of the Radio Receiver Tube Placement Guide is simple—and practical. It shows exactly where to replace tubes in more than 4,500 receivers, covering 1938 to 1947 models. Every tube layout diagram is clear and easy to follow. Each is based on accurate, original research.

You will find this book is an invaluable time-saver because it eliminates hit-and-miss tube placement and risky guessing. The handy index locates the set and then refers to the diagram so that replacement of the tubes is accomplished quickly and correctly.

The Radio Receiver Tube Placement Guide is another indispensable "SAMS" Publication—a practical, accurate book, intended to save time and to help you earn more money.

The "Howard W. Sams Tube Placement Guide" is a handy book, 5¼" x 8¼" in size and containing 192 pages. The service technician's net price is $1.25; and this book is currently available through your authorized PHOTOFACT distributor.

★ ★

INTERESTING VISIT

A few weeks ago, we were visited by Mr. Joseph Alinsky, Director of Service and Television Departments, and Mr. R. C. Patton, Chief Laboratory Instructor, of Valparaiso Technical Institute. Mr. Alinsky and Mr. Patton came in to look over the Howard Sams Institute, and to discuss the television servicing problem.

We spent several hours discussing test techniques, service equipment, and training methods for television servicing. "Joe" and "Pat" gave us a good outline of the television work underway at Valparaiso Tech., and we reciprocated by outlining some of our plans in the same field. Their visit is more evidence of the completeness with which the Howard Sams Institute is making every effort to contact all phases of the television industry, so that when we bring you television data, it will represent authentic and reliable information.

We all agree that television servicing will make some important changes in the servicing picture, but they will be to your advantage if you are properly prepared and informed.

Several days ago we received a letter from Mr. Alinsky, from which we quote:

"I should have written sooner to thank you for the courtesy you extended to Mr. Patton and me during our visit a few weeks ago.

After visiting you, I can well understand the success of the Howard Sams organization. The detailed and complete manner with which you prepare your PHOTOFACTS was reflected in the way you opened your doors to us. After the tour through your establishment, I feel that I have been acquainted with the Howard Sams organization for years. I hope you benefited as much from our visit as we did. It is very gratifying to talk to a group as alert and eager as yours."

FIELD EXPERIENCES

Here is your opportunity for passing practical service experiences to others for the benefit of all. For every service "Field Experience" published, we issue to the author a certificate that is good for one PHOTOFACT Folder Set. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Co., Inc.

★ ★

FORD 6MF080
Photofact 4610-18, Set 10

"I have had a number of these sets come in either dead or intermittent and found that all voltage and resistances checked normal. The trouble in each case was traced to a defective second i.f. transformer. The coil resistance was normal with no apparent shorts or opens. After a little more checking it was decided to remove the transformer. The trouble was found in one of the trimmer capacitors, one plate of the capacitor having a burr on it. Apparently, after the set had been in use in the automobile, this burr had punctured the mica dielectric and caused an intermittent shorting of the secondary coil. The cure is to file off the burr with a piece of emery and to replace the mica. We no longer remove the transformer but merely remove the can from around it."

Submitted by: Mr. Henry W. Finch, Box 66, Palisades Park, N. J.

★ ★

MOTOROLA MODEL 67L11, CHASSIS HS59
Photofact 481-21, Set 31

"If set has hum and sounds fuzzy, reversing the line plug will often clear this condition. If dial pointer drags, it can be overcome by moving chassis back and adding two small washers in between the mounting ears."

★

MOTOROLA MODELS 405, 505, 605, AND 705
Photofact 463-8, Set 3 **Photofact 465-1, Set 5**
Photofact 464-37, Set 4 **Photofact 467-19, Set 7**

"These sets use a flat, three-piece shaft which is riveted together at one end. I have had a lot of these shafts buckle; and when turned, they would make contact with the vibrator socket prongs above it, thereby blowing the fuse. The shaft can be pulled out of the volume control as it has forged prongs; and the rivets can be tightened with a few hammer blows.

"A piece of large diameter spaghetti can be slipped over the shaft to prevent future trouble."

★

MOTOROLA MODELS FD6 AND NH6
Photofact 467-20, Set 7
Photofact 469-24, Set 9

"If dial pointer sticks and seems to drag when tuning manually, the trouble usually can be overcome by removing the background mask and trimming its free edge with a pair of scissors, as this is what causes the dial to drag.

"The filter condenser in these models is mounted with the lugs downward. The electrolyte may leak on the wires passing in the vicinity and this will cause the set to play weak and distorted. This can be cleared by washing the wires with carbon tetrachloride, separating them, and then removing them from the vicinity of the condenser."

★

MOTOROLA MODEL 65T21
Photofact 461-1, Set 1

"Dial pointer dragging is in most cases due to the brown cardboard background being warped or by not being glued level to the steel background plate. To overcome this I force glue behind the cardboard, then use a block and a 'C' clamp to remove the bumps. Remove clamp and block when glue is dry."

★

MOTOROLA MODELS 77XM21, 77XM22
Chassis HS102, HS89
Photofact Pending

"Low volume, fuzzy or poor tone with about 60 volts across the input filter condenser has been traced to a weak dry disc rectifier. Replace rectifier and listen to difference in tone and pep this set will have on broadcast and FM."

MOTOROLA MODEL 5A5
Photofact 463-11, Set 3

"I have found that the switch, Item 43, Folder 463-11, Set 3, operated by the loop to turn the set on and off, can be made to have a better opening action by bending the small rolled ear that projects through the front of the cabinet.

"These sets may be brought in with the complaint that the 117Z3 rectifier will not go out with the lid closed. Assuming that the switch is opening, the next most likely source of trouble is a grounded battery box. The quickest way to check this is to use the following procedure. With all batteries removed, the front door closed (so that the switch will be open), and without the AC cord being plugged into the wall receptacle or set, check with an ohmmeter between the can and the two bottom brass strips, and also between the can and the two top clips inside the battery box. Any reading will indicate a short or leakage which is due to leaked electrolyte from an exhausted leaky 1½-volt 'A' cell left in the set. The only remedy is to replace the battery box, strips and insulators. This involves riveting and drilling."

★

AUTO RADIOS USING SOLENOID OPERATED TONE CONTROL

"This type control is operated by pushing in the volume control knob. If the spring is missing from behind the knob, it will cause the switch on the volume control shaft to stay closed and overheat the coil causing it to tburn up. When one of these sets is brought in for repair with a burned up coil, check the operation of the shaft in the switch and supply a spring if necessary. This Part No. is 70627.

"If any of these sets sound distorted or choked, check the 180 ohm bias resistor that goes from center tap to minus on the filter condenser."

Submitted by: Mr. Frank Krantz, Kay's Radio,
4627 Rising Sun Avenue, Philadelphia, Pennsylvania

★ ★

ZENITH CHANGER S-11680
Photofact 4717-32, Set 27

"Trouble: Electrical reject button would not cause reject mechanism to trip.

"The muting and solenoid cutout switch, Part No. 70, PHOTOFACT Folder 4717-32, is normally closed. The points on this switch are made of sections of wire spot welded to strips of copper so that they come together at right angles to one another. Since the cylindrical surfaces present very little contact area the relatively high solenoid current causes them to burn and make poor or no contact.

"This can be cleared by taking the switch apart and filing both contacts to increase the contact area and bending the strips so as to increase the contact pressure."

★

SPEAKER REPAIR HINT

"Speakers that have a rubbing cone may be repaired very quickly in the following manner:

"Remove the dust cover and insert a speaker shim or shims whichever is needed at the point where the cone is rubbing. Then saturate the entire cone, being careful not to wet the voice coil itself. Let the cone dry with the shims in place and then remove. This procedure eliminates removing the cone and saves a lot of time and money. I have repaired several speakers in this manner and have not had a single complaint or call-back."

Submitted by: Mr. LeRoy Ragsdale, Modern Radio Service,
2114 Rogers Avenue, Fort Smith, Arkansas

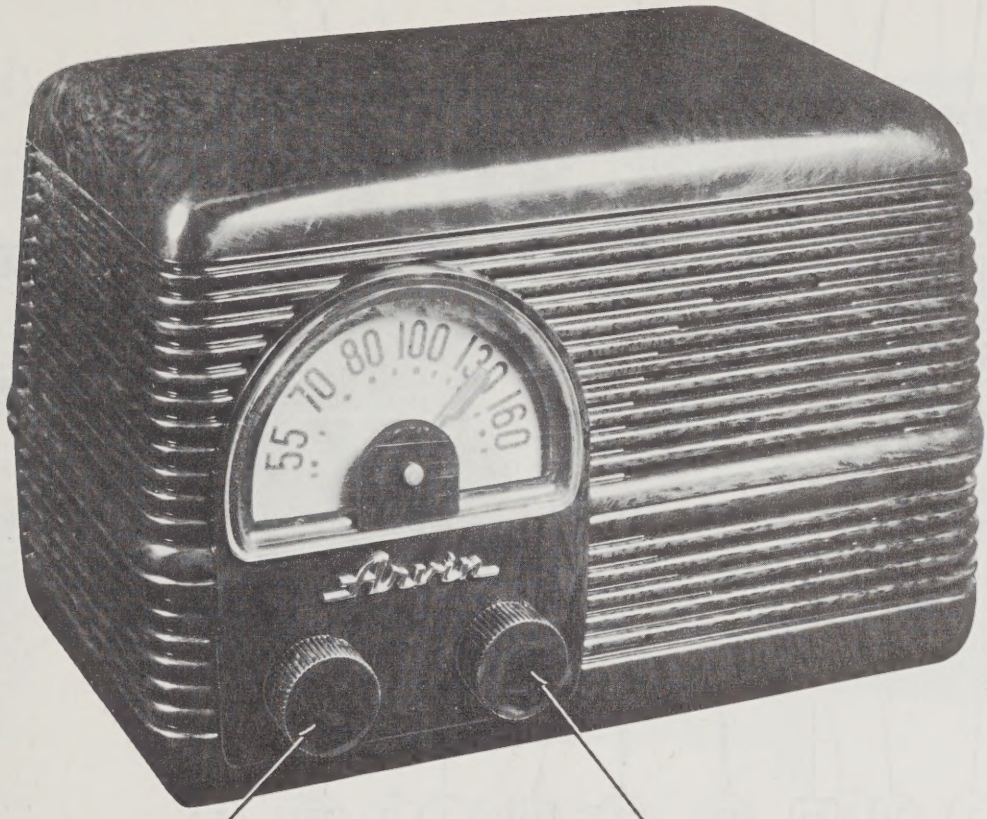
PUBLICATION DATES

When will other sets of PHOTOFACT Folders be published?

Volume 4—Set No. 34	**February 20**
Volume 4—Set No. 35	**March 20**
Volume 4—Set No. 36	**March 20**
Volume 4—Set No. 37	**April 16**

If you have been unable to get any issues of PHOTOFACT *Folder Sets, send your order and money directly to us and we will see that you are supplied.*

ARVIN MODEL
152T



ARVIN MODEL
152T

ARVIN MODEL 152T

TRADE NAME	Arvin, Model 152T
MANUFACTURER	Noblitt Sparks Industries, Columbus, Ind.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1620KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 2/48 SET #33 FOLDER #483-1

PARTS LIST AND DESCRIPTIONS

ARVIN MODEL 152T

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ARVIN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ARVIN PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	A21499	DSB-403020-150	TA-240	PRSA40302	EZ4215C	Filter - Red
B	20	150						" - Blue
C	20	25			TA-25			Cathode Bypass - Grn.
7	.05	400	C20068-503	MPH-4-05	TC-15	484-05	DT4S5	Line Filter
8	.02	400	C20068-203	S-4-02	TC-12	484-02	DT4S2	Output Plate Bypass
9	.01	400	C20068-103	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
10	.002	600	C20069-202	S-6-002	TC-22	684-002	DT6D2	" "
11	.05	200	C20067-503	S-4-05	TC-15	484-05	DT2S5	AVC Filter
12	.05	400	C20068-503	S-4-05	TC-15	484-05	DT4S5	Line Isolation
13	500	500	C20065-501	MO.5-35	1FM-35	1468-0005	5W5T5	AF Plate Bypass
14	100	500	C20065-101	MO.5-31	1FM-31	1468-0001	5W5T1	Diode RF Filter
15	.50	350	A21643	MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	1 Meg.	½	C21511	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 16A per instructions
C	Switch		" "	41	SW-A	" " " " "

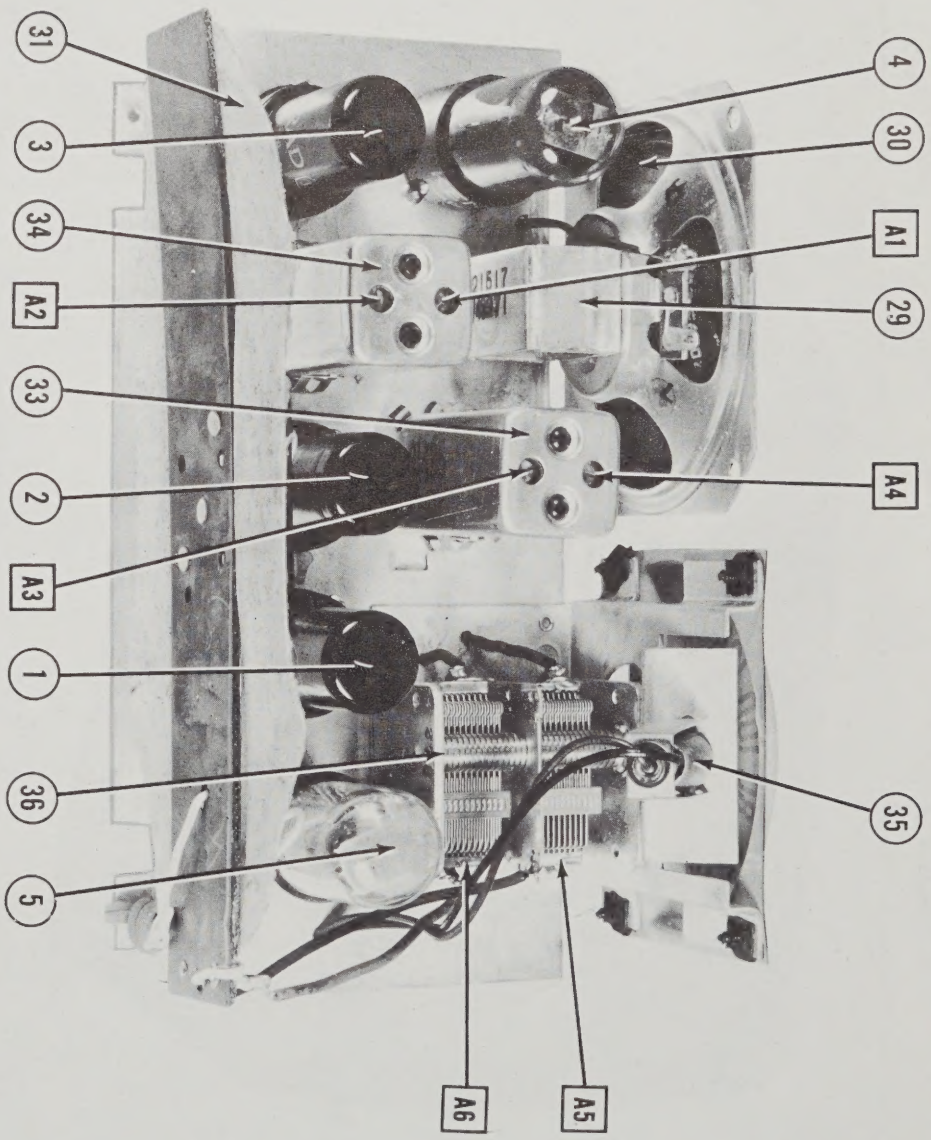
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ARVIN PART No.	IRC PART No.	IDENTIFICATION CODES
17	22KΩ	½	C20060-223	BTS-22K	Red-Red-Or. Oscillator Grid
18	15 Meg.	½	C20060-156	BTS-15 Meg.	Br.-Grn.-Blue AVC Network
19	2.2 Meg.	½	C20060-225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
20	15 Meg.	½	C20060-156	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
21	470KΩ	½	C20060-474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
22	470KΩ	½	C20060-474	BTS-470K	Yl.-Vi.-Yl. Output Grid
23	150Ω	½	C20060-151	BW-½-150	Br.-Grn.-Br. Output Cathode
24	1200Ω	1	C20070-122	BTA-1200	Br.-Red-Red Filter
25	330KΩ	½	C20060-334	BTS-330K	Or.-Or.-Yl. Line Isolation
26	15Ω	½	C20060-150	BW-½-15	Br.-Grn.-Blk. Rectifier Ballast
27	330Ω	½	C20060-331	BW-½-330	Or.-Or.-Br. Pilot Light Shunt

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: ARVIN PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
28	1750Ω	4.0Ω	188Ω tapped @ 8Ω	.4Ω	AC21497-1	A-3876*		A-2928*	*Add extra filter to reduce hum level and drill new mounting holes.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ARVIN PART No.	JENSEN PART No.		
	FIELD	VC IMP.		ST-113		
29	PM	4.0Ω	C-21517	Mod. P4-X		
	CONE DIA.	VC DIA.				
30	4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

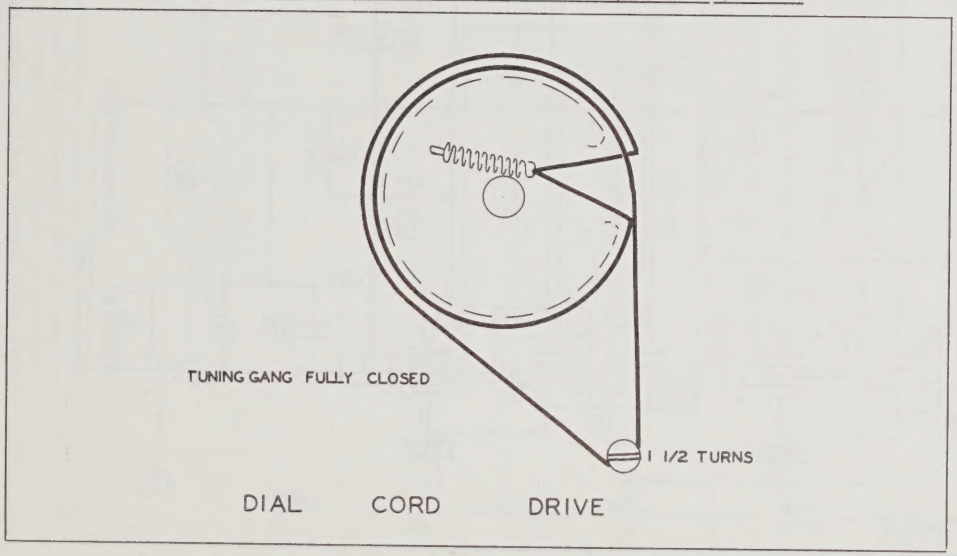
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	ARVIN PART No.	MEISSNER PART No.	
31	Loop Ant.		1.5Ω	AC21521-1		
32	Osc. Coil	.5Ω	5.2Ω	AC21492-1	14-1040	
33	Input IF	20Ω	20.3Ω	AC21495-1	16-6658	
34	Output IF	20Ω	20.1Ω	AC21496-1	16-6660	

DIAL LIGHT

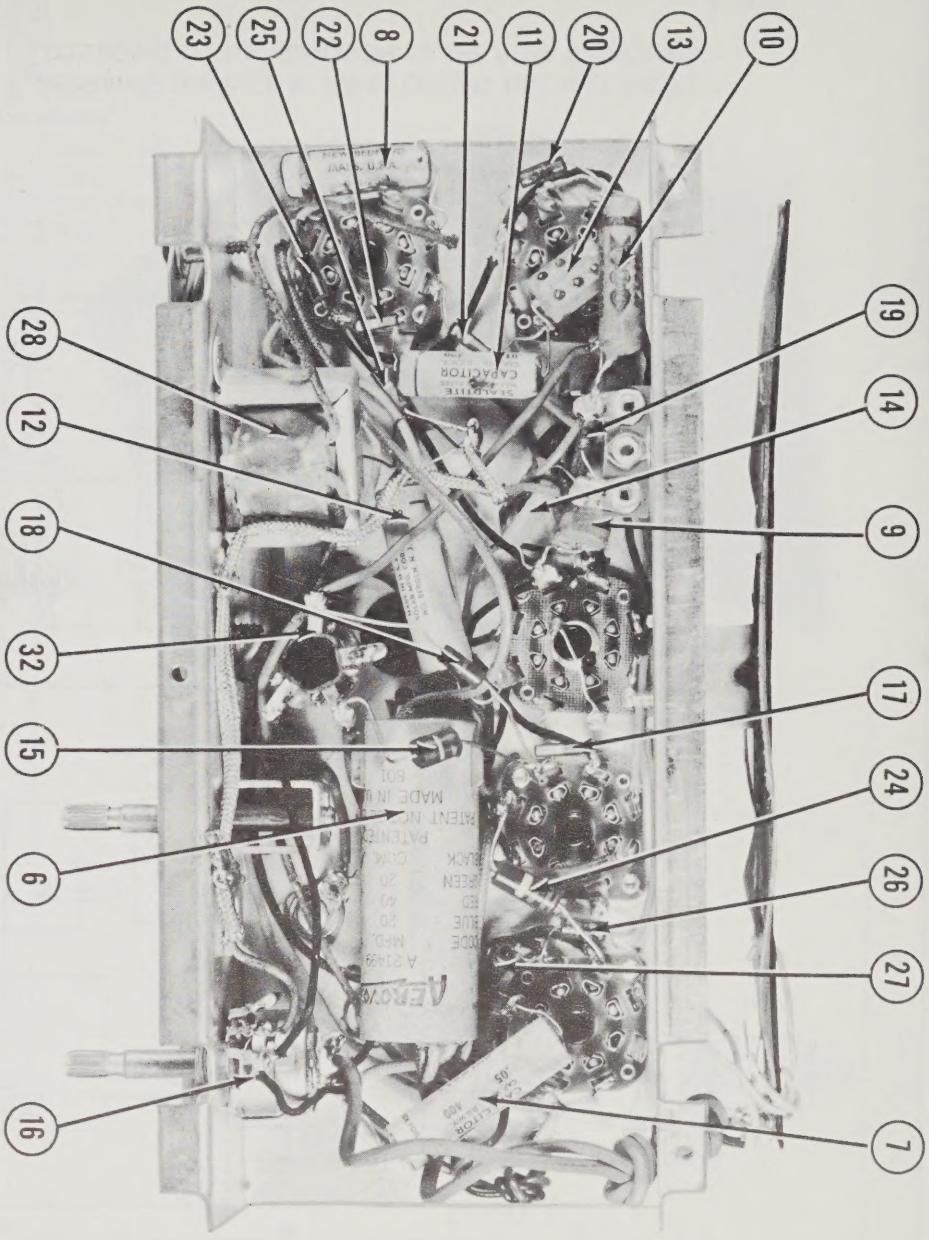
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					ARVIN PART No.		
35	Bayonet	6-8	0.15	Brown	A19351		Type 47

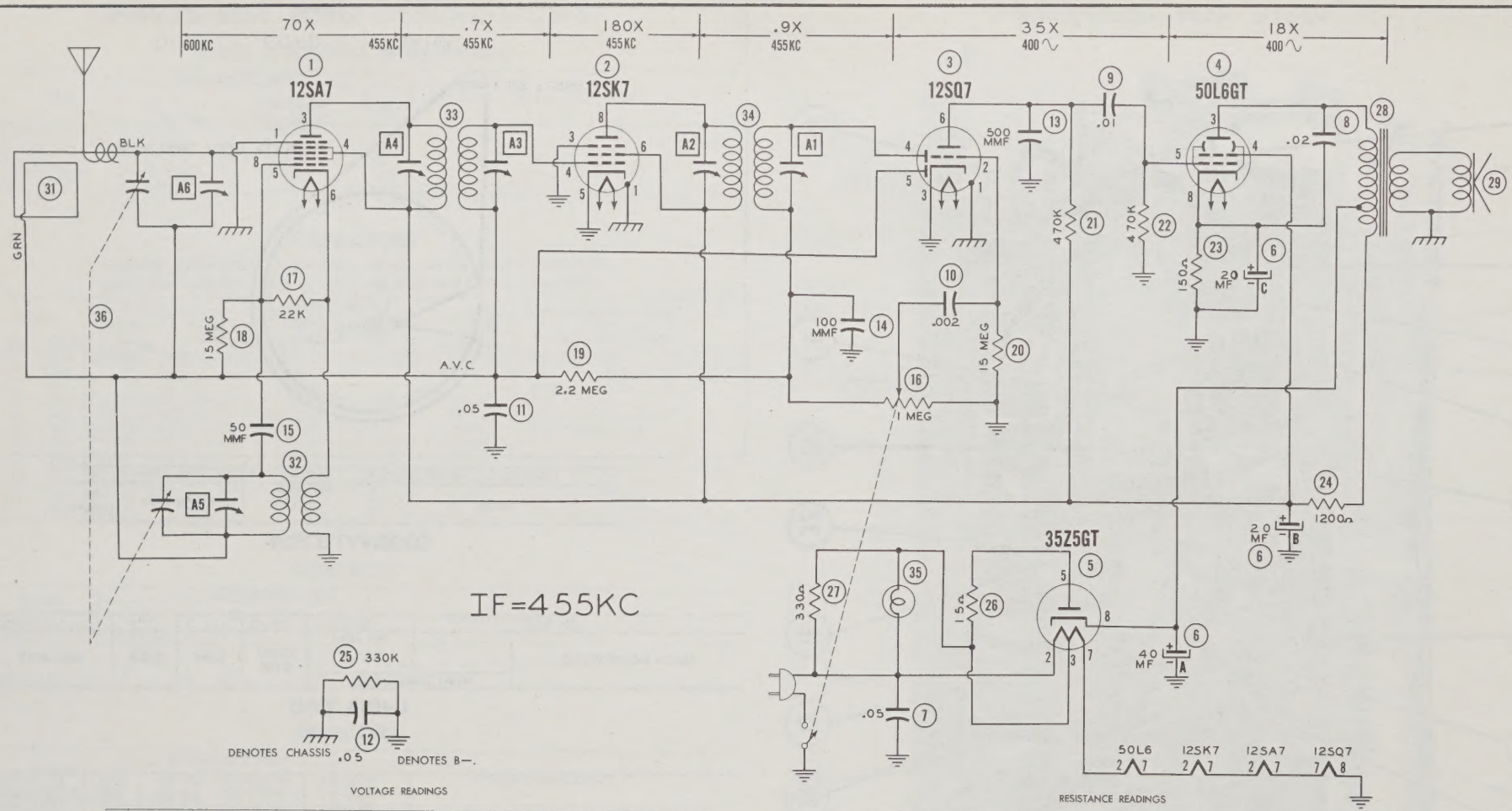
MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
36	2 Gang Var. Cap	C21481	(25-396MMF, 35-403MMF)



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	26.5VAC	95VDC	95VDC	-13VDC§	0V.	13.5VAC	-.2VDC
2	12SK7	0V.	37VAC	0V.	-.7VDC	0V.	95VDC	26.5VAC	95VDC
3	12SQ7	0V.	-.6VDC	0V.	-.5VDC	-.6VDC	57VDC	13.5VAC	0V.
4	50L6GT	0V.	90VAC	115VDC	95VDC	0V.	0V.	37VAC	5.9VDC
5	35Z5GT	0V.	117VAC	113VAC	124VDC	111VAC	0V.	90VAC	124VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	360KΩ	26Ω	400KΩ	400KΩ	22KΩ	.8Ω	13Ω	3 Meg.
2	12SK7	360KΩ	37Ω	0Ω	3 Meg.	0Ω	400KΩ	26Ω	400KΩ
3	12SQ7	360KΩ	15 Meg.	0Ω	850KΩ	3 Meg.	870KΩ	13Ω	0Ω
4	50L6GT	INF.	87Ω	400KΩ	400KΩ	500KΩ	0Ω	37Ω	150Ω
5	35Z5GT	INF.	115Ω	110Ω	400KΩ	125Ω	INF.	87Ω	400KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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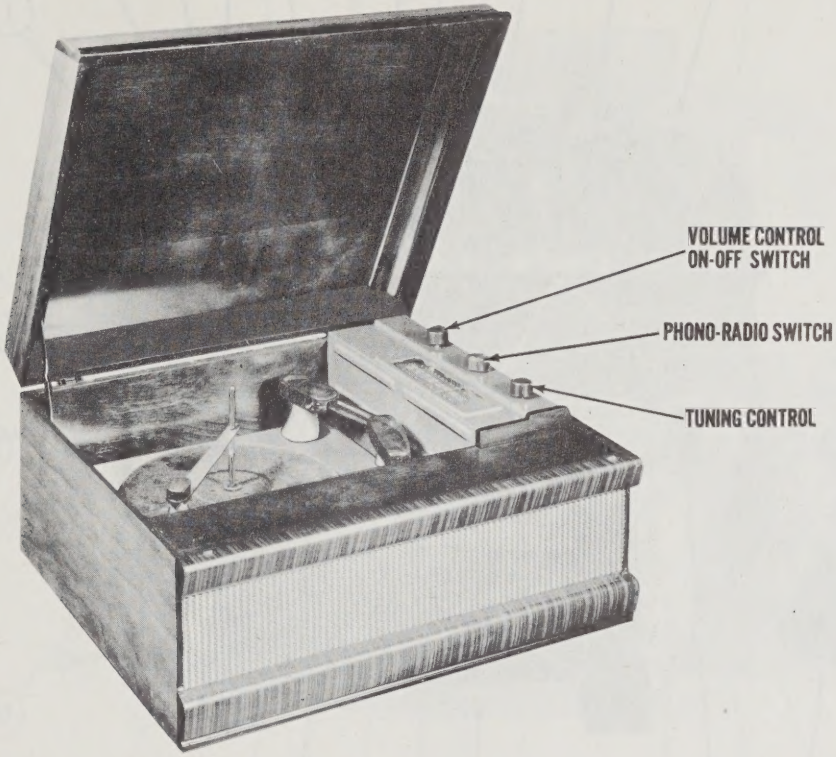
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

CROSLEY MODELS
56TZ



CROSLEY MODELS
56TZ

CROSLEY MODEL 56TZ

TRADE NAME	Crosley, Models 56TZ
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5 Rectifier.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .24 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to notch in left hand edge of dial backplate.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	High side to ext. ant. lead. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	200MMFD	"	1620KC	"	"	A5	" " " "
3	200MMFD	"	1400KC	Tune for maximum output.	"	A6	" " " "

DISASSEMBLY INSTRUCTIONS

1. Remove three push-on type control knobs.
2. Unsolder leads from speaker.
3. Unsolder leads from terminal strip under record changer.
4. Unsolder phono-motor leads.
5. Remove six Phillips head wood screws holding escutcheon to cabinet. Remove from cabinet.
6. Remove five Phillips head wood screws holding chassis in cabinet. Remove chassis from cabinet.
7. Remove one Phillips head screw holding speaker in cabinet. Remove speaker from cabinet.

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DATE 2/48 SET #33 FOLDER #483-2

PARTS LIST AND DESCRIPTIONS

CROSLEY MODELS 56TQ, 56TZ

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CROSLEY PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	20	150	B-135732	DSB-5030-150	TA-530	PRSA150-30-50	EDL5315	Filter - Blue #
B	60	150						" - Red
C	20	150		M-20-150	UT-201	PRS150-20	BR2015	" - Grn.
6A	50	150	B-136770	DSB-2x40-150	TA-530	PRSA150-30-50	EDL5315	Filter*
B	30	150						"
7	.05	200	39001-17	MPH-4-05	TC-15	484-05	DT2S5	Line Filter
8	.022	200	39001-80	S-4-02	TC-12	484-02	DT2S2	Output Plate Bypass
9	.022	200	39001-80	S-4-02	TC-12	484-02	DT2S2	Audio Coupling
10	.003	600	39001-76	S-6-003	TC-23	684-003	DT6D3	" "
11	.00025	600	39001-73	S-6-00025	TC-325	1468-00025	DT6T25	AF Plate Bypass
12	.003	600	39001-76	S-6-003	TC-23	684-003	DT6D3	Tone Comp.
13	.02	600	39001-86	S-6-02	TC-12	684-02	DT6S2	Hum Neutralization*
14	.075	600	39001-17	S-6-05	TC-15	684-05	DT6S5	Phono Isolation
15	.1	200	39001-19	S-2-1	TC-1	484-.1	DT2P1	Line Isolation
16	.05	200	39001-80	S-4-05	TC-15	484-05	DT2S5	AVC Filter

#Used in early production. * Used in late production.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
17A	1 Meg.	½	B-135692	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

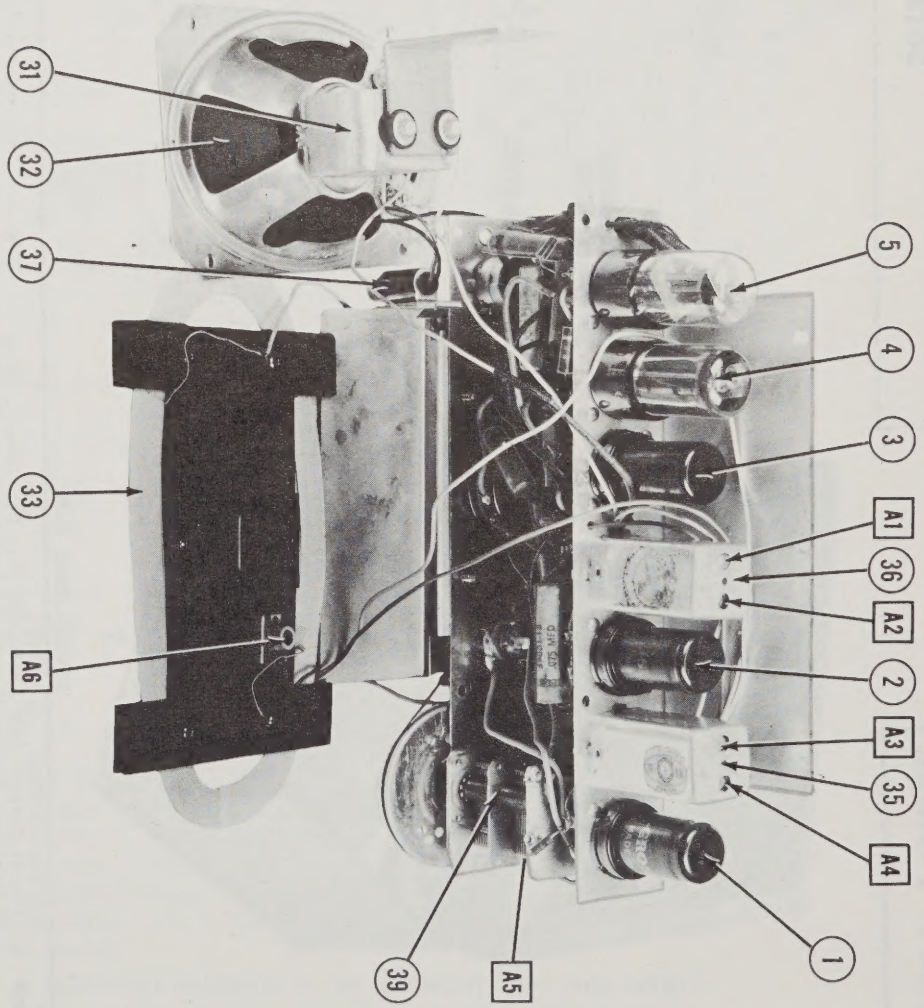
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES
18	15 Meg.	½	39373-109	BTS-15 Meg.	Br.-Grn.-Blue AVC Network
19	22KΩ	½	39373-80	BTS-22K	Red-Red-Or. Oscillator Grid
20	220KΩ	½	39373-80	BTS-220K	Red-Red-Yl. Line Isolation
21	3.3 Meg.	½	39373-100	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
22	5 Meg.	½	39373-35	BTS-4.7 Meg.	Grn.-Blk.-Grn. AF Grid
23	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
24	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. Output Grid
25	150Ω	½	39373-16	BW-½-150	Br.-Grn.-Br. Output Cathode
26	1200Ω	1	39373-144	BTA-1200	Br.-Red-Red Filter
27	47Ω	1	W-137367	BW-1-47	Surge Limiter
28	150Ω	½	39373-16	BW-½-150	Br.-Grn.-Br. Pilot Light Shunt
29	22KΩ	½	39373-60	BTS-22K	Red-Red-Or. Hum Neutralizing-See Note

Note-Used only in later production.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: CROSLEY PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
30	2100Ω	3.7Ω	230Ω	1Ω	B-137723	A-3876†	T22S45†	A-2928†	†File mounting holes to fit replacement.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
	FIELD	VC IMP.				
31	PM	3.7Ω	AD-136420			
	CONE DIA.	VC DIA.				
32	4"x6"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

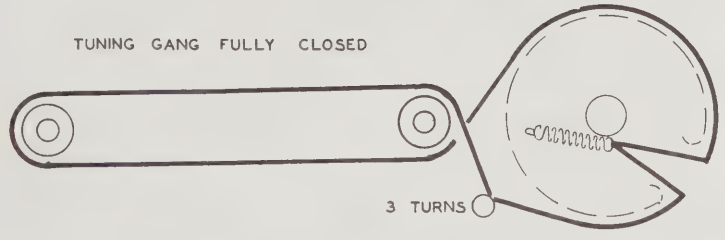
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: MEISSNER PART No.	
33	Loop Ant.	0Ω	1.8Ω	AC-136333		
34	Osc. Coil	.5Ω	5.5Ω	AW-135730	14-1040‡	‡Add 50MMFD from high side tuning cap. to osc. grid.
35	Input IF	33Ω	33Ω	AW-135729	16-6658	
36	Output IF	32Ω		AW-135731	16-6670	

DIAL LIGHT

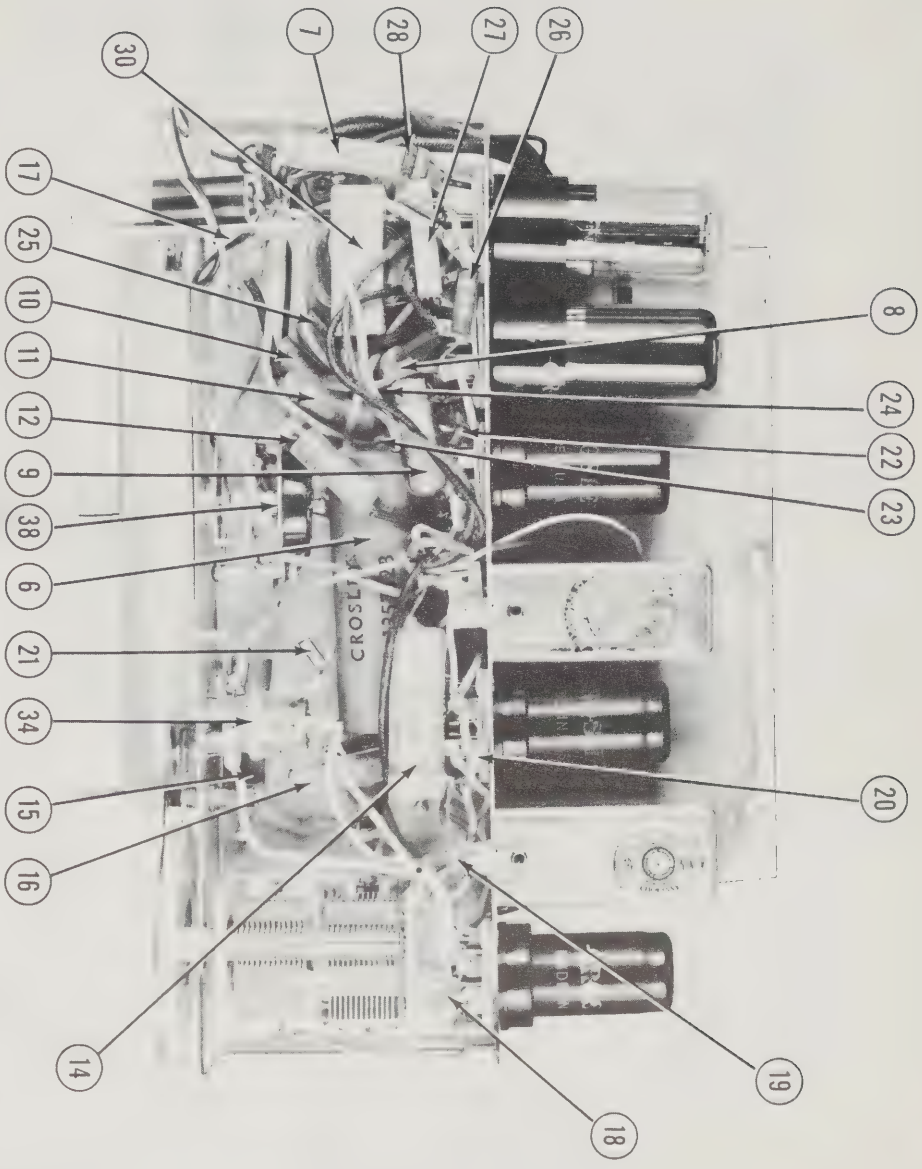
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
37	Bayonet	6-8	0.15	Brown	W-48858		Type 47

MISCELLANEOUS

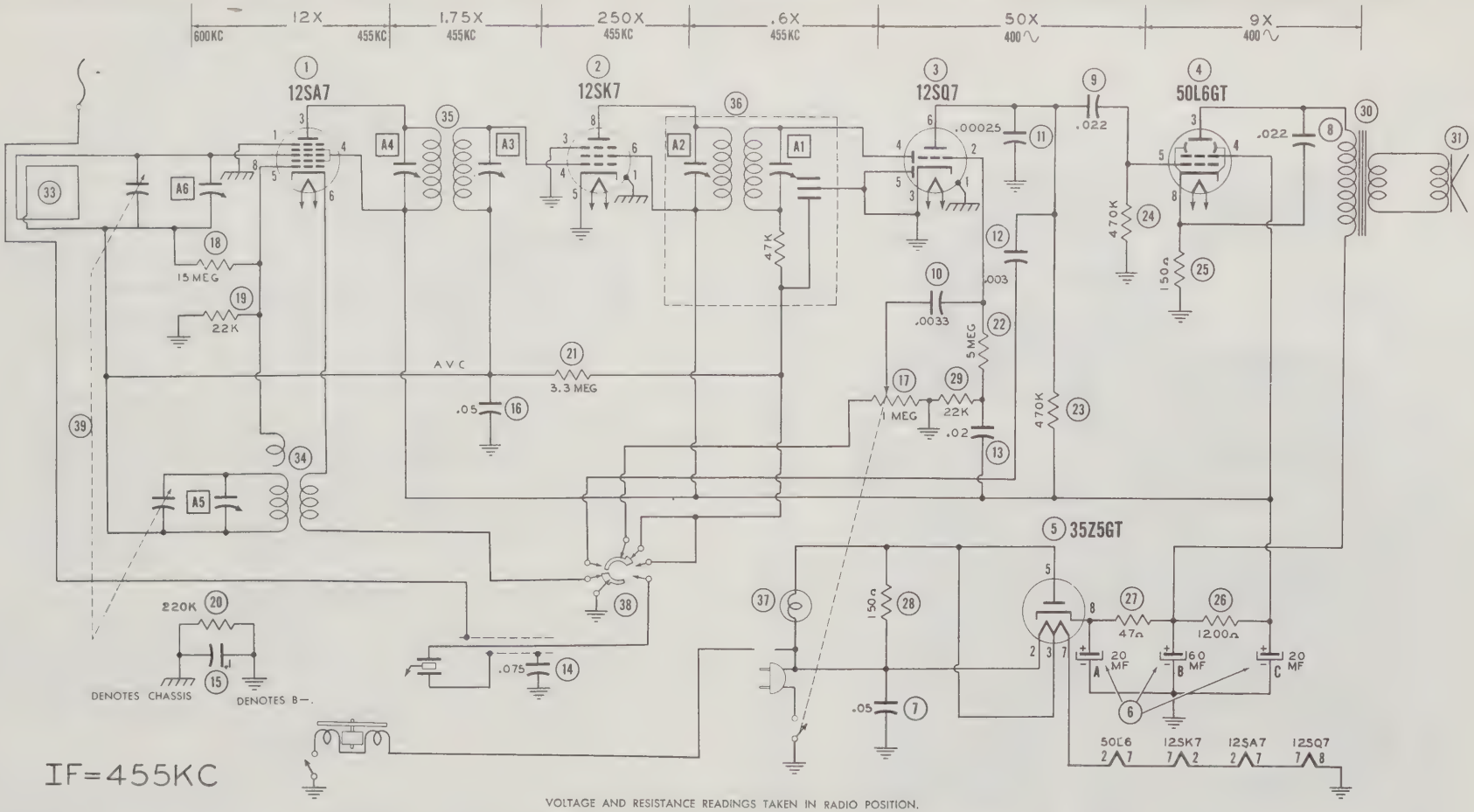
ITEM No.	PART NAME	CROSLEY PART No.	NOTES
38	Switch	B-135641	Radio-Phono-Tone
39	2 Gang Var. Cap.	B-135570	(13-467MMF, 35-278MMF)
	Dial Pointer	B-135460	
	Dial Glass	B-138318	
	Knob	W-135929	Dial or Volume
	"	W-135930	Radio-Phono



CHASSIS—BOTTOM VIEW



DATE 2/48 SET #33 MODEL #4-2



VOLTAGE AND RESISTANCE READINGS TAKEN IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]VDC	[illegible]	[illegible]	[illegible]VAC	[illegible]
2	12SK7	0V.	25.5VAC	0V.	-.6VDC	0V.	87VDC	38VAC	87VDC
3	12SQ7	0V.	-.6VDC	0V.	-.4VDC	0V.	50VDC	13VAC	0V.
4	50L6	0V.	85VAC	110VDC	[illegible]	0V.	[illegible]	[illegible]	[illegible]
5	35Z5	0V.	117VAC	113VAC	117VDC	113VAC	117VDC	85VAC	120VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	12SK7	250KΩ	26Ω	0Ω	4 Meg.	0Ω	40KΩ	36Ω	40KΩ
3	12SQ7	250KΩ	5 Meg.	0Ω	1 Meg.	0Ω	510KΩ	12.5Ω	0Ω
4	50L6	INF.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	35Z5	INF.	115Ω	107Ω	40KΩ	107Ω	40KΩ	85Ω	40KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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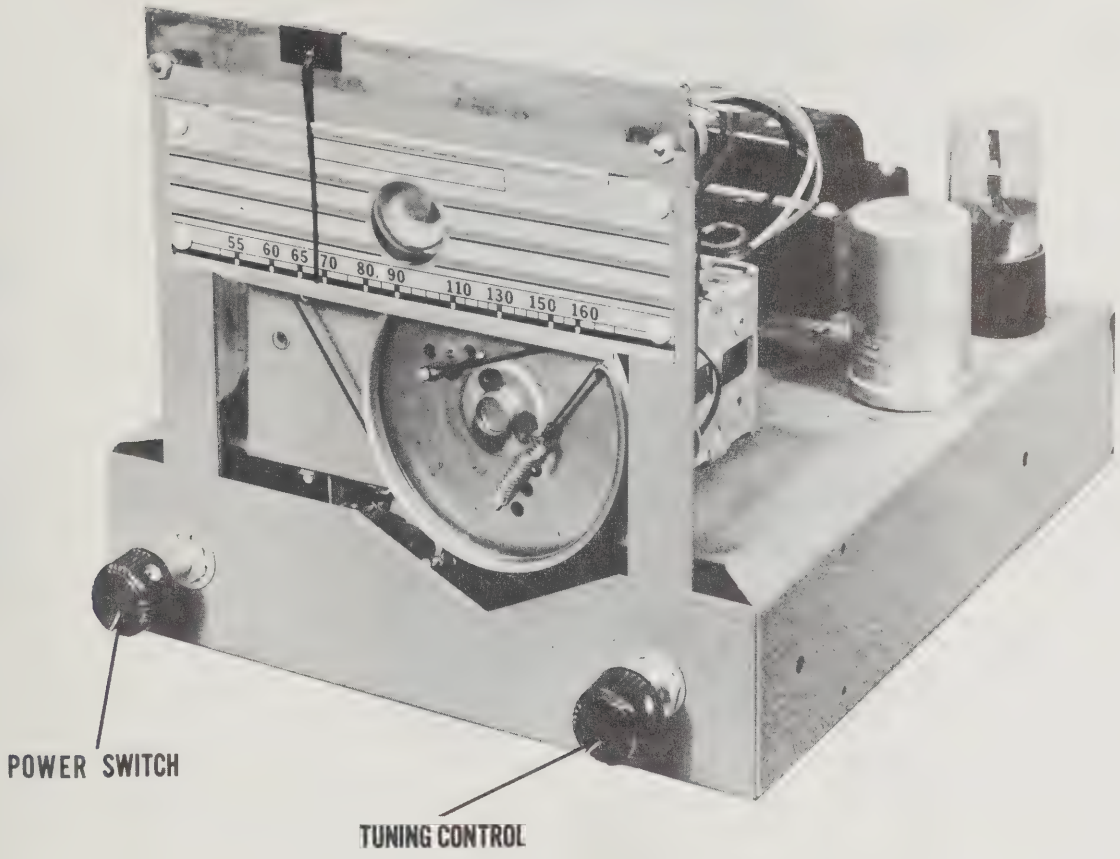
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

DAVID BOGEN
MODEL R501



DAVID BOGEN
MODEL R501

DAVID BOGEN MODEL R501

TRADE NAME	David Bogen, Model R501
MANUFACTURER	David Bogen Co., Inc., 663 Broadway, New York 12, N.Y.
TYPE SET	AC Operated Superheterodyne Tuner
TUBES (SIX)	Types, 6SK7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6H6 Det.-AVC, 6U5 Tuning Eye, 6X5GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1680KC RATING .21 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Output of sig. gen. should be no higher than necessary to obtain satisfactory shadow on tuning eye tube 6U5. Use insulated alignment screwdriver for all adjustments.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to center section of tuning cap. Low side to chassis.	456KC	Tuning cap. fully open.		A1,A2, A3,A4.	Adjust for narrowest shadow on tuning eye tube 6U5.
2	DIRECT	High side to terminal "A". Low side to terminal "G" of ant. terminal strip.	1680KC	"		A5	"
3	DIRECT	"	1400KC	Tune for narrowest shadow on tuning eye.		A6,A7	"

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DATE 2/48 SET #33 FOLDER #483-3

PARTS LIST AND DESCRIPTIONS

DAVID BOGEN
MODEL R501

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		DAVID BOGEN PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6SK7	6SK7	8N	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	Det.-AVC	6H6	6H6	7Q	
5	Tuning Eye	6U5	6U5	6R	
6	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	DAVID BOGEN PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
7A	10	450		DY-2x10-450	EL-210	AF22J	UP1145	Filter
B	10	450						"
8	.02	600		S-6-02	TC-12	684-02	DT6S2	Audio Coupling
9	.02	600		S-6-02	TC-12	684-02	DT6S2	" "
10	.05	600		S-6-05	TC-15	684-05	DT6S5	AVC Filter
11	.05	600		S-6-05	TC-15	684-05	DT6S5	" "
12	.006	600		S-6-006	TC-26	684-006	DT6D6	Ant. Coupling
13	150			MO.5-315	1FM-315	1468-00015	5W5T15	Diode RF Filter
14	150			MO.5-315	1FM-315	1468-00015	5W5T15	" " "
15	150			MO.5-315	1FM-315	1468-00015	5W5T15	" " "
16	25			MO.5-425	1FM-425	1468-000025	5W5Q25	Osc. Grid Cap.
17	5000			MW.5-25	1FM-25	1467-005	1D5D5	Fixed Pad.
18	5000			MW.5-25	1FM-25	1467-005	1D5D5	" "
19	25			MO.5-425	1FM-425	1468-000025	5W5Q25	Fixed Trimmer

RESISTORS

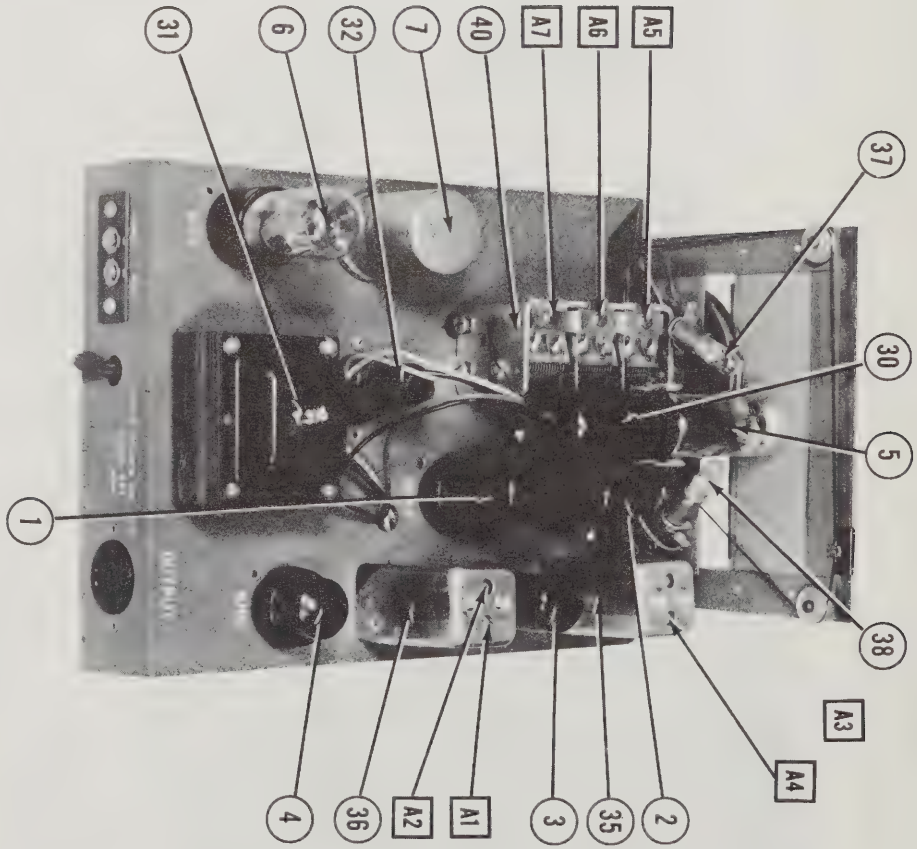
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	DAVID BOGEN PART No.	IRC PART No.	
20	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AVC Network
21	24KΩ	½		BTS-22K	Red-Yl.-Or. Oscillator Grid
22	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode RF Filter
23	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. AVC Network
24	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Diode Load
25	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. Audio Coupling
26	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. " "
27	200Ω	½		BW-½-220	Red-Blk.-Br. " "
28	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Diode Load
29	10KΩ	10		AB-10K	Filter
30	1 Meg.	½		BTS-1 Meg.	Br.-blk.-Grn. Tuning Indicator Plate Load

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	DAVID BOGEN PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
31	117V AC @ .21A	500V CT @ .024A	6.0V CT @ 2.5A		T356B		T22R00*	P-2949*

*Use universal mounting brackets.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

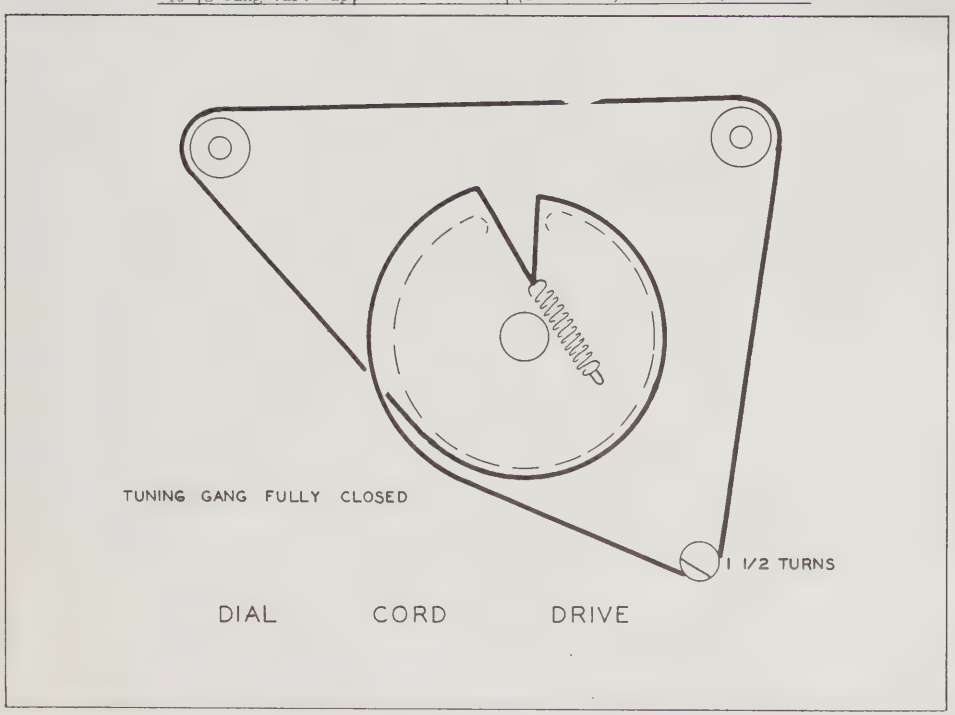
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA DAVID BOGEN PART No.	REPLACEMENT DATA MEISSNER PART No.
32	Ant. Coil	29.2Ω	3.9Ω		14-1026
33	RF Coil	85Ω	3.8Ω		14-1027
34	Osc. Coil		5.1Ω		14-1040
35	Input IF	14.9Ω	14.9Ω		16-6658
36	Output IF	20.5Ω	13.5Ω		16-6660

DIAL LIGHT

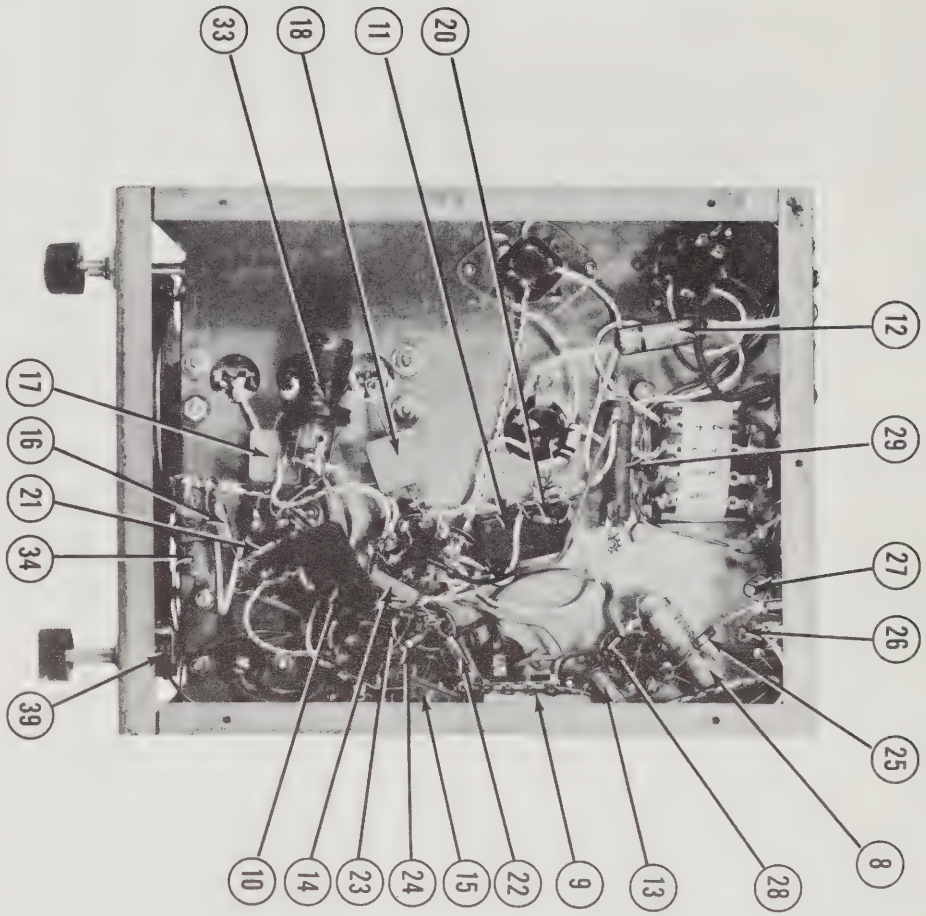
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA DAVID BOGEN PART No.		INSTALLATION NOTES
37	Bayonet	6-8	0.15	Brown			Type 47
38	"	"	"	"			" "

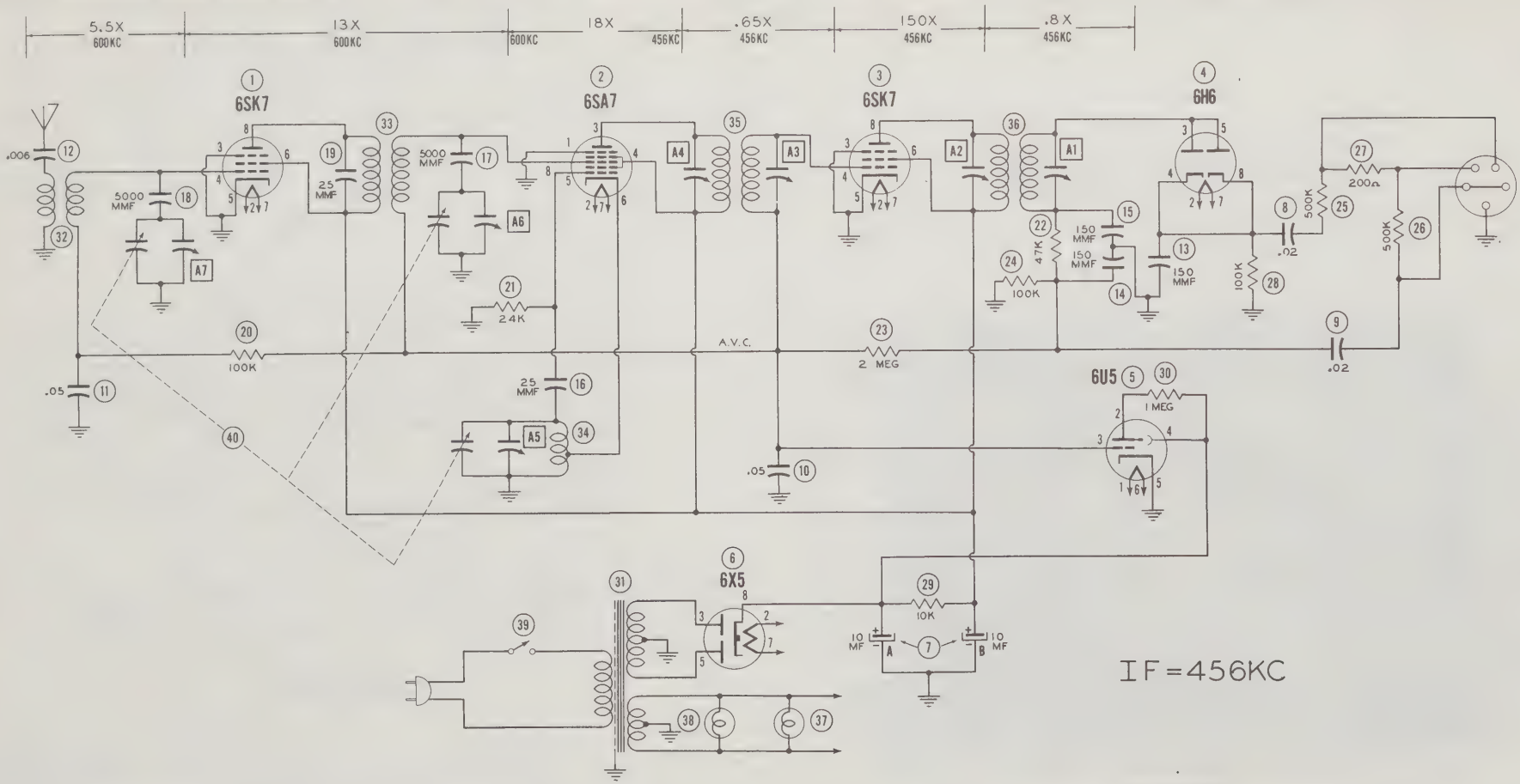
MISCELLANEOUS

ITEM No.	PART NAME	DAVID BOGEN PART No.	NOTES
39	Switch		On-Off (SPST)
40	3 Gang Var. Cap.		(30-512MMF, 30-512MMF, 34-200MMF)



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V.	3VAC	0V.	-.8VDC	0V.	65VDC	3VAC	-.8VDC
2	6SA7	0V.	3VAC	-.8VDC	65VDC	-10VDC§	0V.	3VAC	-.8VDC
3	6SK7	0V.	3VAC	0V.	-.8VDC	0V.	65VDC	3VAC	65VDC
4	6H6	0V.	3VAC	-.8VDC	.1VDC	-.2VDC	0V.	3VAC	.1VDC
5	6U5	3VAC	0V.	-.8VDC	0V.	0V.	0V.	-	-
6	6X5	0V.	0V.	250VAC	0V.	250VAC	0V.	3VAC	280VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0Ω	.05Ω	120KΩ	120KΩ	22KΩ	.8Ω	.05Ω	120KΩ
2	6SA7	0Ω	.05Ω	120KΩ	120KΩ	22KΩ	.8Ω	.05Ω	2.1 Meg.
3	6SK7	0Ω	.05Ω	0Ω	2.1 Meg.	0Ω	120KΩ	.05Ω	120KΩ
4	6H6	0Ω	.05Ω	150KΩ	100KΩ	150KΩ	0Ω	.05Ω	100KΩ
5	6U5	.05Ω	1.5K	2.1 Meg.	1.5K	0Ω	.05Ω	-	-
6	6X5	INF.	.05Ω	500Ω	INF.	500Ω	INF.	.8Ω	120KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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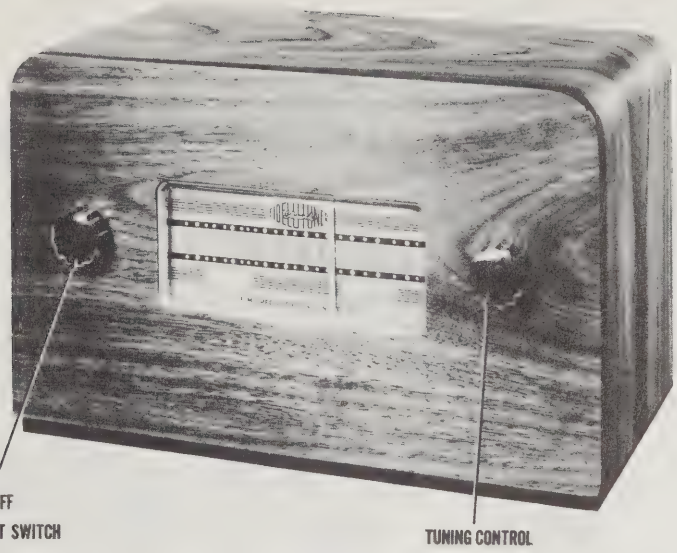
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

EDWARDS MODEL
FIDELOTUNER



TRADE NAME	Edwards, Model Fidelotuner
MANUFACTURER	Edwards F-M Radio Corp., 168 Washington St., New York 6, N.Y.
TYPE SET	AC Operated FM Tuner
TUBES (FIVE)	Types, 6J6 Converter, 6SH7 1st IF Amp., 6SH7 2nd IF Amp., 6SH7 Limiter, 6H6 Discriminator
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—FREQ. MOD.	88-108MC RATING .20 Amp. @ 117 Volts AC

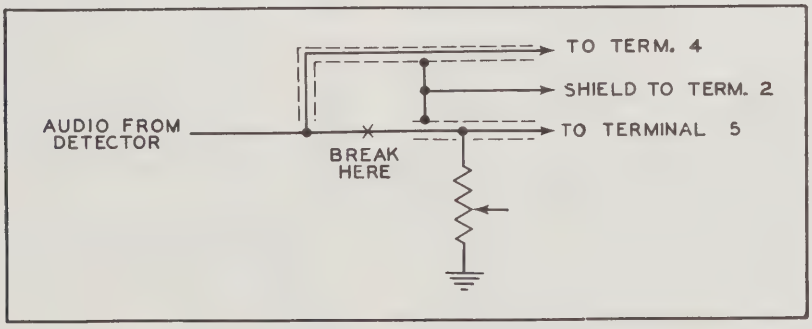
TERMINAL STRIP CONNECTIONS
(Reading from left to right)

Terminal 1 & 2 — Dipole Connections
Terminal 2 ——— Ground
Terminal 3 ——— Point Ⓐ Alignment Point
Terminal 4 —— Phono Connection
Terminal 5 —— Output to Amplifier
Terminal 6 —— Point Ⓒ Alignment Point

To connect the fidelotuner to a radio chassis having a phonograph record player, the output of the record player is connected to terminals 2 and 4 through a shielded lead. The shield is connected to terminal 2. The output to the amplifier or phono input is taken from terminals 2 and 5 through a shielded lead with the shield connected to terminal 2.

On receivers having a phono input connection but no record player, connect terminals 2 and 5 to phono input connection through a shielded lead with the shield connected to terminal 2. No other connections are required.

On receivers having no phonograph connection, make the following changes in the receiver circuit.



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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		EDWARDS PART No.	STANDARD REPLACEMENT		
1	Converter	6J6	6J6	7BF	
2	1st IF Amp.	6SH7	6SH7	7BK	
3	2nd IF Amp.	6SH7	6SH7	7BK	
4	Limiter	6SH7	6SH7	7BK	
5	Discriminator	6H6	6H6	7..	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	EDWARDS PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
6A	30	150		DY-4030-150	EL-43*	AF86D4A	UP4315	◘ Filter
B	40	150						▲ "
7	.02	200		S-4-02	TC-12	484-02	DT4S2	Filament Bypass
8	.02	200		S-4-02	TC-12	484-02	DT4S2	Audio Coupling
9	.01			S-4-01	TC-11	484-01	DT4S1	Limiter Screen Bypass
10	.01			S-4-01	TC-11	484-01	DT4S1	2nd IF Screen Bypass
11	.01			S-4-01	TC-11	484-01	DT4S1	1st IF Screen Bypass
12	100			MO.5-31	1FM-31	1468-0001	5W5T1	Disc. RF Filter
13	1000			MO.5-21	1FM-21	1468-001	1W5D1	De-emphasis
14	1000			MO.5-21	1FM-21	1468-001	1W5D1	Limiter Plate Decoupling
15	100			MO.5-31	1FM-31	1468-0001	5W5D1	Limiter Grid Filter
16	1000			MO.5-21	1FM-21	1468-001	1W5D1	2nd IF Plate Decoupling
17	500			MO.5-35	1FM-35	1468-0005	5W5T5	IF Coupling
18	500			MO.5-35	1FM-35	1468-0005	5W5T5	1st IF Plate Decoupling
19	500			MO.5-35	1FM-35	1468-0005	5W5T5	IF Coupling
20	1000			MO.5-21	1FM-21	1468-001	1W5D1	Conv. Plate Coupling
21	1000			MO.5-21	1FM-21	1468-001	1W5D1	Filament Bypass
22	500			MO.5-35	1FM-35	1468-0005	5W5T5	Osc. Grid Cap.

*Do not use bypass section.

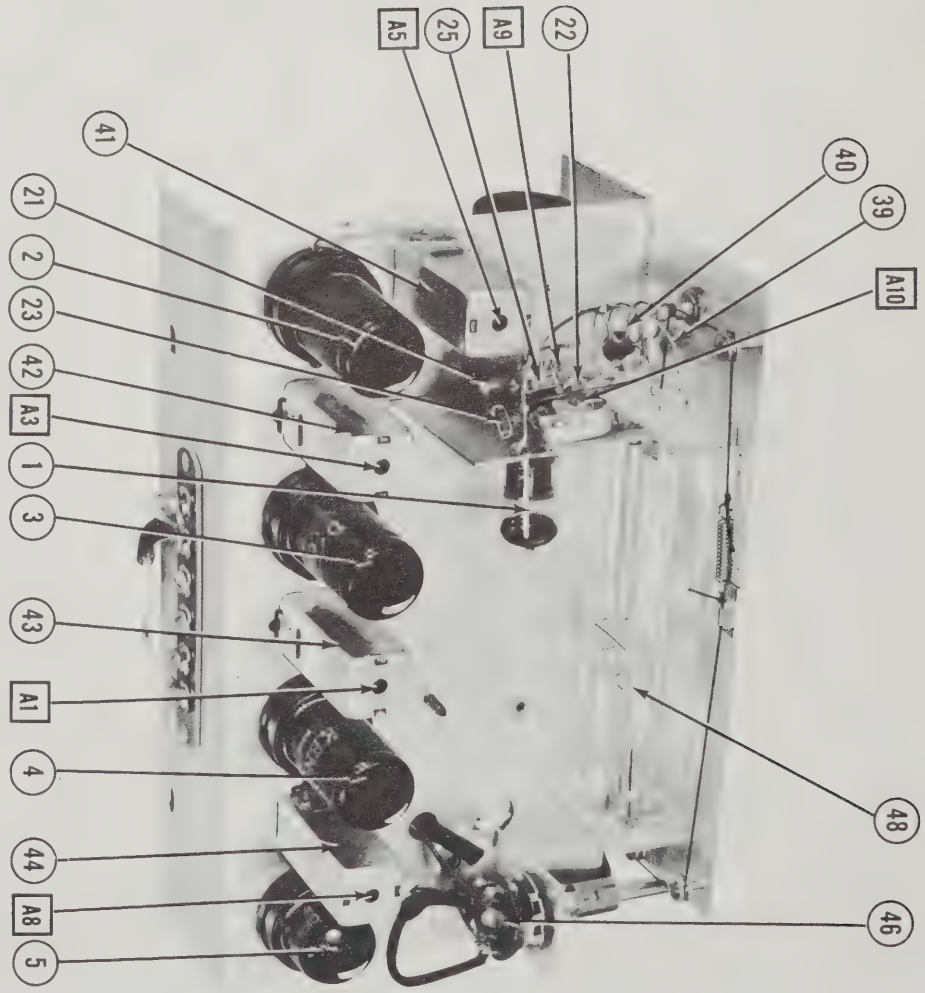
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	EDWARDS PART No.	IRC PART No.	
23	1000Ω	½		BTS-1000	Br.-Blk.-Red Converter Cathode
24	2700Ω	½		BTS-2700	Red-Vi.-Red Oscillator Plate Decoupling
25	20KΩ	½		BTS-22K	Red-Blk.-Or. Oscillator Grid
26	1000Ω	½		BTS-1000	Br.-Blk.-Red Converter Plate Decoupling
27	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. 1st IF Grid
28	1000Ω	½		BTS-1000	Br.-Blk.-Red 1st IF Plate Decoupling
29	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. 2nd IF Grid
30	1000Ω	½		BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoupling
31	50KΩ	½		BTS-47K	Grn.-Blk.-Or. 3rd IF Grid
32	1000Ω	½		BTS-1000	Br.-Blk.-Red 3rd IF Plate Decoupling
33	21KΩ	½		BTS-22K	Red-Br.-Or. 3rd IF Decoupling
34	150KΩ	½		BTS-150K	Br.-Grn.-Yl. Discriminator Diode Load
35	150KΩ	½		BTS-150K	Br.-Grn.-Yl. " " "
36	50KΩ	½		BTS-47K	Grn.-Blk.-Or. De-emphasis
37	750Ω	1		BTA-680	Vi.-Grn.-Br. Filter

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	EDWARDS PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
38	117V AC @ .2A	117V AC @ .025A	6.3V AC @ 2.0A					

CHASSIS—TOP VIEW



CHASSIS—BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA EDWARDS PART No.	REPLACEMENT DATA MEISSNER PART No.	
39	Ant. Coil		.1K			
41	Osc. "		.6Ω			
42	1st IF	.5K	.5Ω			
43	2nd IF	.5K	.5Ω			
44	3rd IF	.5K	.5Ω			
40	Disc. Trans.	.5K	.5Ω*			*tapped at .5Ω.

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA EDWARDS PART No.	INSTALLATION NOTES
45	Bayonet	7.5	0.2	White		Type 51

MISCELLANEOUS

ITEM No.	PART NAME	EDWARDS PART No.	NOTES
46	Switch		On-Off (FM Phono)(DPDT)
47	Rectifier		Selenium
48	Tuning Lines		Ant. Osc.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Allow receiver to warm up for at least 15 minutes before attempting alignment.
To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low frequency end of dial.
Use insulated alignment screwdriver for all adjustments.

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator.
In Step 5 after A8 has been aligned for zero deflection at 10.7MC tune signal generator to 10.8MC and note reading of VTVM. Tune signal generator to 10.6MC and note reading of VTVM. These two readings should be the same but of opposite polarity. If they are not repeat Steps 4 & 5.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01 MFD	High side to Pin 4 (grid) 6SH7 2nd IF Tube (3). Low side to chassis.	10.7MC (unmodulated)	High freq. end of dial.	DC probe to Point A. Common to chassis.	A1,A2,	Adjust for maximum deflection.
2	.01 MFD	High side to Pin 4 (grid) 6SH7 1st IF Tube (2). Low side to chassis.	"	"	"	A3,A4	" " " "
3	.01 MFD	High side to Pin 6 (grid) 6J6. Low side to chassis	"	"	"	A5,A6	" " " "
4	.01 MFD	High side to Pin 4 (grid) 6SH7 limiter tube (4). Low side to chassis.	"	"	DC probe to Point B. Common to chassis.	A7	" " " "
5	.01 MFD	"	"	"	DC probe to Point C. Common to chassis	A8	Adjust for zero deflection. Check linear deviation per prealignment notes. Continue with Step 6.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60~ modulation and 450KC sweep except in Step 4 where 225KC sweep is used. Use 120~ sawtooth voltage in scope for horizontal deflection.
In Step 3 disconnect ant. coil from Pin 6 of 6J6. Connect 100KΩ resistor from Pin 6 to chassis making leaps as short as possible (Preferably soldered direct to Pin 6 and nearest ground point). Connect high side of signal generator in series with .01 MFD cap. to Pin 6, low side to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.01 MFD	High side to Pin 4 (grid) 6SH7 1st IF Tube (2). Low side to chassis.	10.7MC (freq. modulated)	High freq. end of dial.	Vertical input to Point A. Ground to chassis.	A1,A2	Adjust for maximum amplitude, symmetry and coincidence of pattern 1.
2	.01 MFD.	"	"	"	"	A3,A4	"
3	.01 MFD.	See prealignment notes.	"	"	"	A5,A6	"
4	.01 MFD.	High side to Pin 4 (grid) 6SH7 1st IF Tube (2). Low side to chassis.	10.7MC (freq. modulated 225KC sweep)	"	"	A7,A8	Adjust A7 for maximum amplitude and A8 for maximum straightness of crossover lines with crossover occuring at center of pattern 2. Disconnect 100KΩ resistor from Pin 4 of 6J6 from Step 3 and reconnect coil. Continue with Step 6.

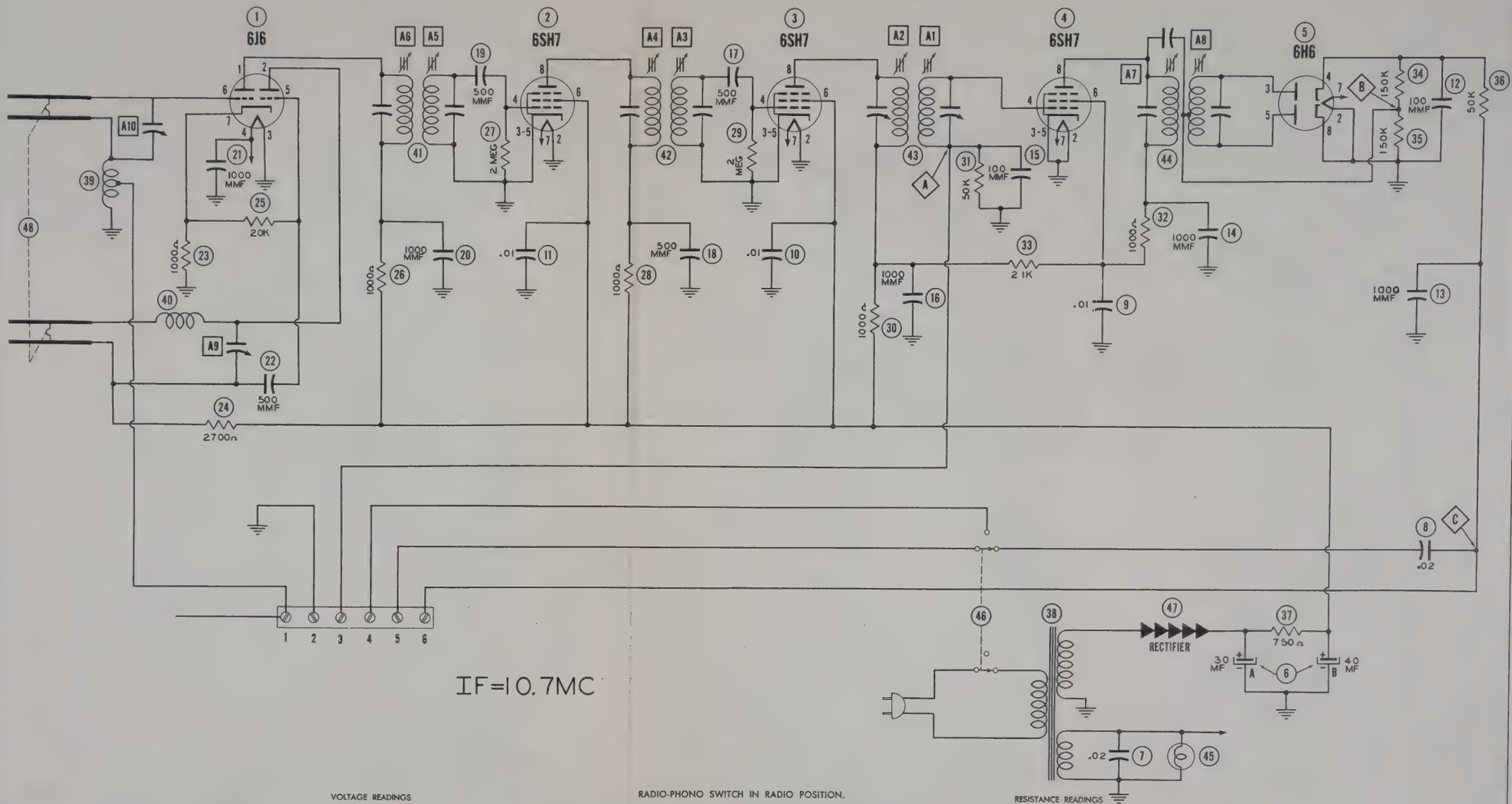
RF ALIGNMENT

In Step 7 when 10MC signal is tuned in with receiver, if dial pointer reads high slightly expand osc. coil (40), if dial pointer reads low slightly compress osc. coil (40) until dial pointer calibrates correctly. Repeat Steps 6 & 7 until no further improvement can be made.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
6	300Ω carbon resistor	High side to terminal "1" (reading from left to right). Low side to terminal "2" of terminal strip on rear of chassis.	106MC (unmodulated)	106MC	DC probe to Point A. Common to chassis.	A9	Adjust for maximum deflection.
7	"	"	90MC	Tune for maximum deflection	"	Osc.Coil (40)	Check calibration per prealignment instructions. Repeat Steps 6 & 7 until no further improvement can be made.
8	"	"	98MC	"	"	A10	Rock tuning control and adjust for maximum deflection.

PATTERN 1

PATTERN 2



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6J6	105VDC	105VDC	0V.	6.3VAC	-2.7VDC§	0V.	3.7VDC	-
2	6SH7	0V.	0V.	0V.	-.5VDC	0V.	105VDC	6.3VAC	97VDC
3	6SH7	0V.	0V.	0V.	-.5VDC	0V.	105VDC	6.3VAC	95VDC
4	6SH7	0V.	0V.	0V.	-.4VDC	0V.	38VDC	6.3VAC	55VDC
5	6H6	0V.	0V.	-.45VDC	0V.	-.4VDC	0V.	6.3VAC	0V.

RADIO-PHONO SWITCH IN RADIO POSITION.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6J6	30KΩ	32KΩ	0Ω	.1Ω	20KΩ	0Ω	900Ω	-
2	6SH7	0Ω	0Ω	0Ω	2 Meg.	0Ω	30KΩ	.1Ω	30KΩ
3	6SH7	0Ω	0Ω	0Ω	2 Meg.	0Ω	30KΩ	.1Ω	30KΩ
4	6SH7	0Ω	0Ω	0Ω	50KΩ	0Ω	51KΩ	.1Ω	52KΩ
5	6H6	0Ω	0Ω	160KΩ	300KΩ	160KΩ	350KΩ	.1Ω	0Ω

$OSCILLATOR VOLTAGE READ WITH POINTER SET AT 88MC.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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483-4

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied for voltage measurements.

FIRESTONE (Air Chief) MODEL
4-A-26 (Code #307-6-9030-A)

FIRESTONE (Air Chief) MODEL
4-A-26 (Code #307-6-9030-A)

AIR CHIEF MODEL 4-A-26

TRADE NAME	Air Chief, Model 4-A-26 (Code 307-6-9030-A)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Ant.
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1725KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With receiver removed from cabinet turn tuning cap. fully closed and mark position of pointer. Use this as index mark in Step 2. After receiver has been reinstalled in cabinet turn tuning cap. fully closed and set pointer to last reference mark at low frequency end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	200MMFD	High side to ext. ant. clip. Low side to B-.	1500KC	4½" from index mark.	"	A5	Adjust for maximum output. Trimmer opposite A5 is a factory adjustment and ordinarily need not be changed.
3	200MMFD	"	"	Tune for maximum output.	"	A6	Adjust for maximum output.

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DATE 2/48 SET #33 FOLDER #483-5

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIR CHIEF PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIR CHIEF PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	500256	DY-40x20-150	EL-24	AF88D	UP4215	■ Filter
B	20	150						▲ "
7	.05	400	502157	MPH-4-05	TC-15	484-05	DT4S5	Rectifier Bypass
8	.02	400	502152	S-4-02	TC-12	484-02	DT4S2	Output Plate Bypass
9	.004	600	502156	S-6-004	TC-24	684-004	DT6D4	Audio Coupling
10	.004	400	502156	S-6-004	TC-24	484-004	DT6D4	" "
11	.05	200	502153	S-2-05	TC-15	484-05	DT2S5	AVC Filter
12	.2	400	502158	S-4-2	TC-2	484-.2	DT4P2	Line Isolation
13	.1	400	502410	S-4-1	TC-1	484-.1	DT4P1	Tuning Cap.
14	.004	400	502156	S-6-004	TC-24	484-004	DT6D4	Ant. Isolation
15	.0008	400	502470	MO.5-3	1FM-37	1479-0008	1W5T8	AF Plate Bypass
16	220	500	502882	MO.5-325	1FM-325	1468-00025	5W5T25	Diode RF Filter
17	47	500	502929	MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR CHIEF PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
18	1 Meg.	½	502928			Volume Control & Sw.

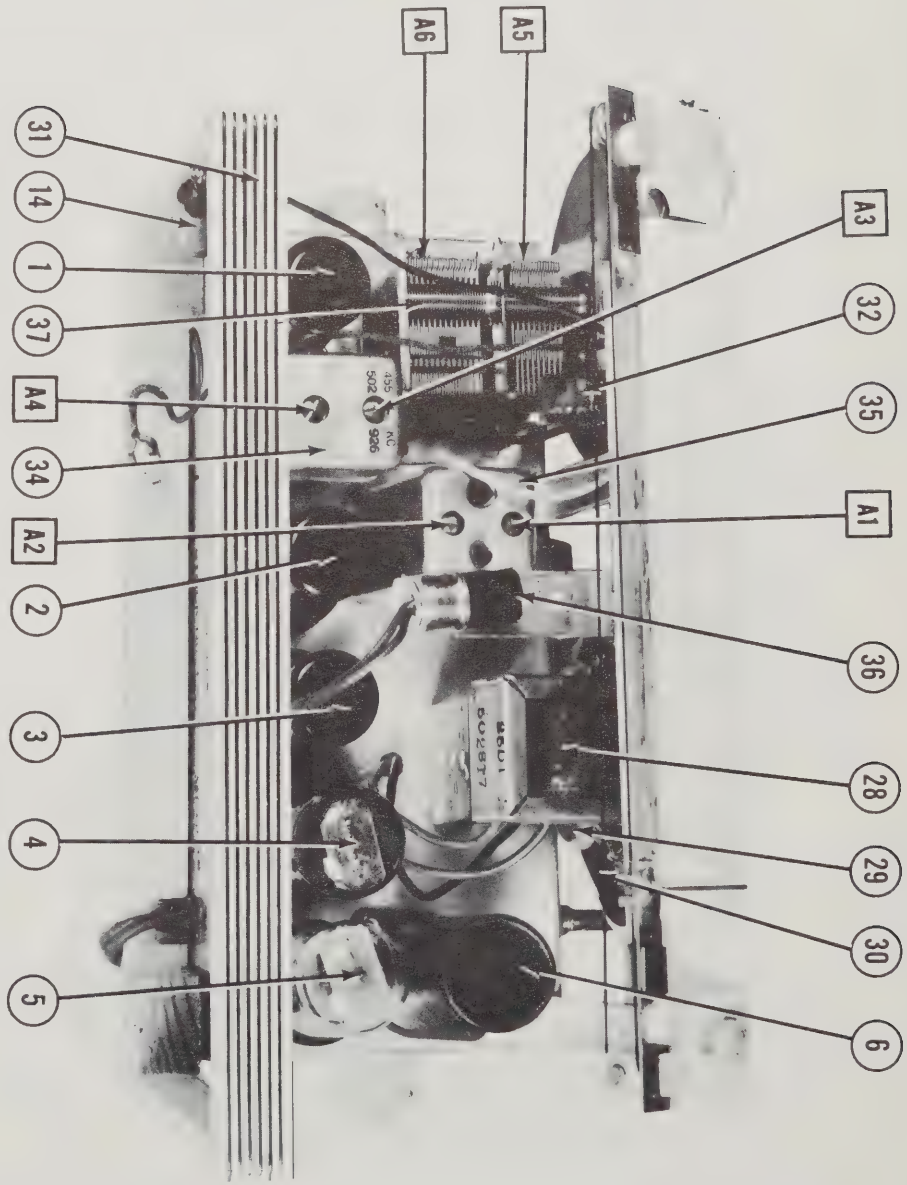
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR CHIEF PART No.	IRC PART No.	IDENTIFICATION CODES
19	22KΩ	¼	502130	BTS-22K	Red-Red-Or. Oscillator Grid
20	2.2 Meg.	¼	502135	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
21	47Ω	¼	502264	BW-¼-47	Yl.-Vi.-Blk. IF Cathode
22	10 Meg.	¼	502136	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
23	470KΩ	¼	502134	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
24	470KΩ	¼	502134	BTS-470K	Yl.-Vi.-Yl. Output Grid
25	150Ω	1	502932	BW-1-150	Br.-Grn.-Br. Output Cathode
26	1500Ω	1	502933	BW-1-1500	Br.-Grn.-Red Filter
27	33Ω	½	502574	BW-½-33	Or.-Or.-Blk. Rectifier Ballast

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIR CHIEF PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
28A	2200Ω	2.8Ω	170Ω tapped @ 9Ω	.6Ω	502817			A-2998*	Used with C-502816 speaker.
28B					504583				Used with W-502816 speaker.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIR CHIEF PART No.	JENSEN PART No.		
29A	FIELD	VC IMP.		ST-113*		*Fabricate new mounting bracket.
B	PM	2.8Ω	C-502816 W-502816	Mod. P4-X		Alternate Speaker
30A	CONE DIA.	VC DIA.				
B	4"	1/2"	502818 504584			

R F COILS

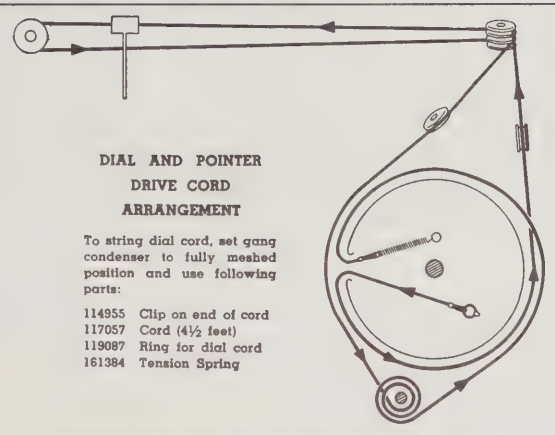
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	AIR CHIEF PART No.	MEISSNER PART No.	
31	Loop Ant.		.1Ω	504348		
32	Ant. Coil	.1Ω	1.2Ω	504899		
33	Osc. Coil	1.2Ω	7.5Ω	502934	14-1040	
34	Input IF	23Ω	23.5Ω	502926	16-6666	
35	Output IF	22.3Ω	21.5Ω	505040	16-6667	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					AIR CHIEF PART No.		
36	Bayonet	6-8	0.15	Brown	118921		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	AIR CHIEF PART No.	NOTES
37	2 Gang Var. Cap.	502925	(25-468MMF, 35-198MMF)
	Dial Scale	502800	Glass
	Knob	504307	Ivory
	Pointer	502367	Pointer

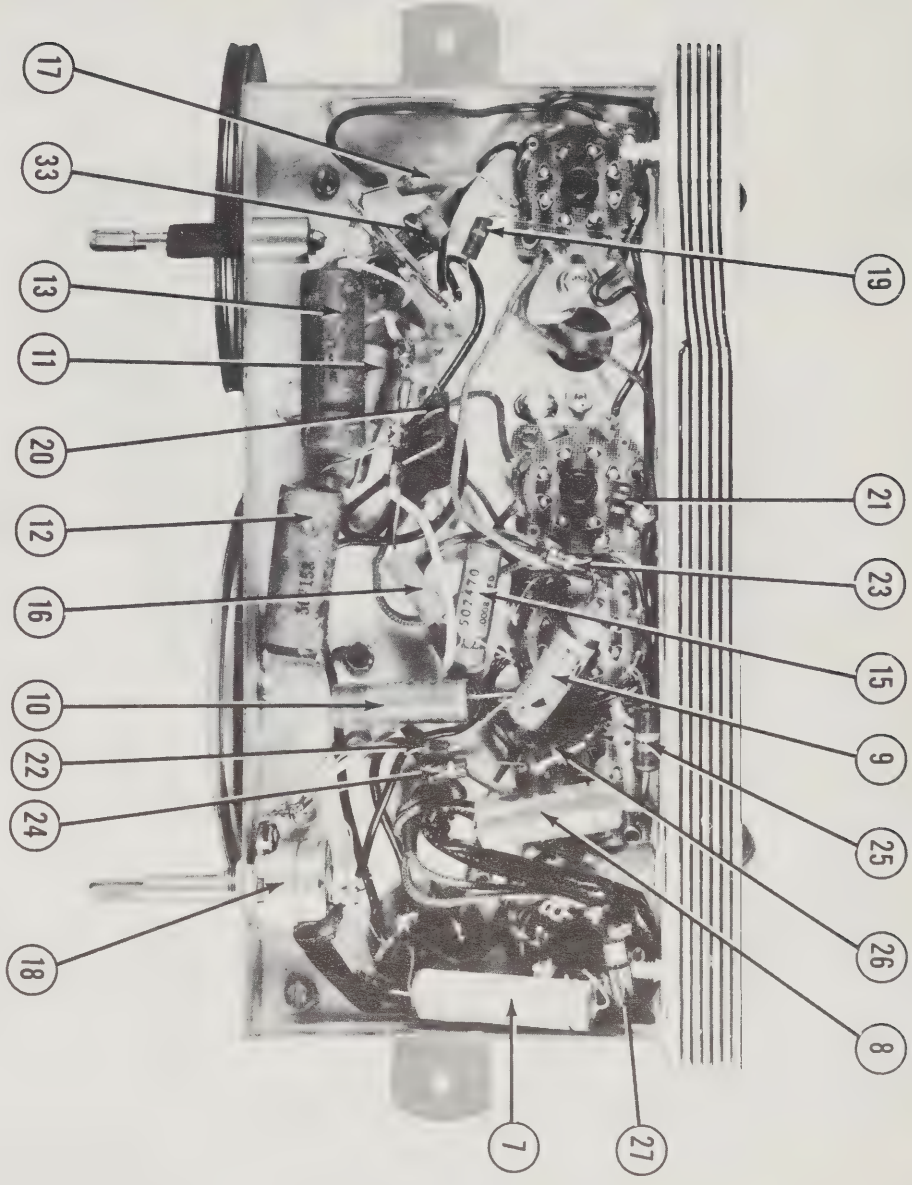


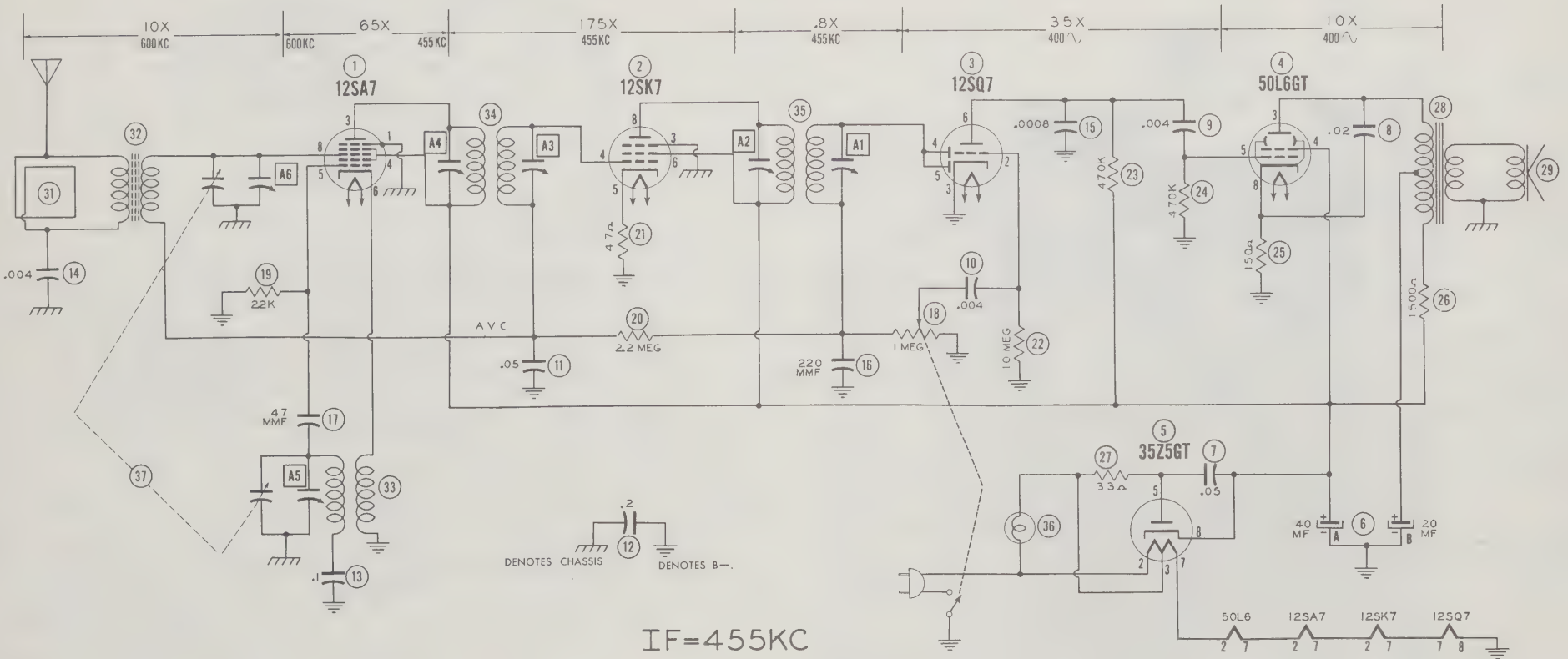
DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

114955 Clip on end of cord
117057 Cord (4½ feet)
119087 Ring for dial cord
161384 Tension Spring

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

§TAKEN WITH VACUUM TUBE VOLTMETER.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	37VAC	85VDC	85VDC	-15.5VDC	0V.	24.5VAC	-.2VDC
2	12SK7	0V.	24.5VAC	0V.	-.4VDC	.4VDC	85VDC	12VAC	85VDC
3	12SQ7	0V.	-.6VDC	0V.	-.4VDC	-.4VDC	43VDC	12VAC	0V.
4	50L6	0V.	89VAC	111VDC	85VDC	0V.	116VDC	37VAC	5VDC
5	35Z5	0V.	117VAC	112VAC	0V.	111VAC	0V.	89VAC	116VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	INF.	36Ω	100KΩ	100KΩ	23KΩ	1.5Ω	.4Ω	3.5 Meg.
2	12SK7	INF.	24Ω	0Ω	3.5 Meg.	50Ω	100KΩ	13Ω	100KΩ
3	12SQ7	INF.	10 Meg.	0Ω	1 Meg.	1 Meg.	570KΩ	13Ω	0Ω
4	50L6	INF.	85Ω	100KΩ	100KΩ	500KΩ	100KΩ	36Ω	150Ω
5	35Z5	INF.	110Ω	108Ω	INF.	140Ω	INF.	85Ω	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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483-5

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

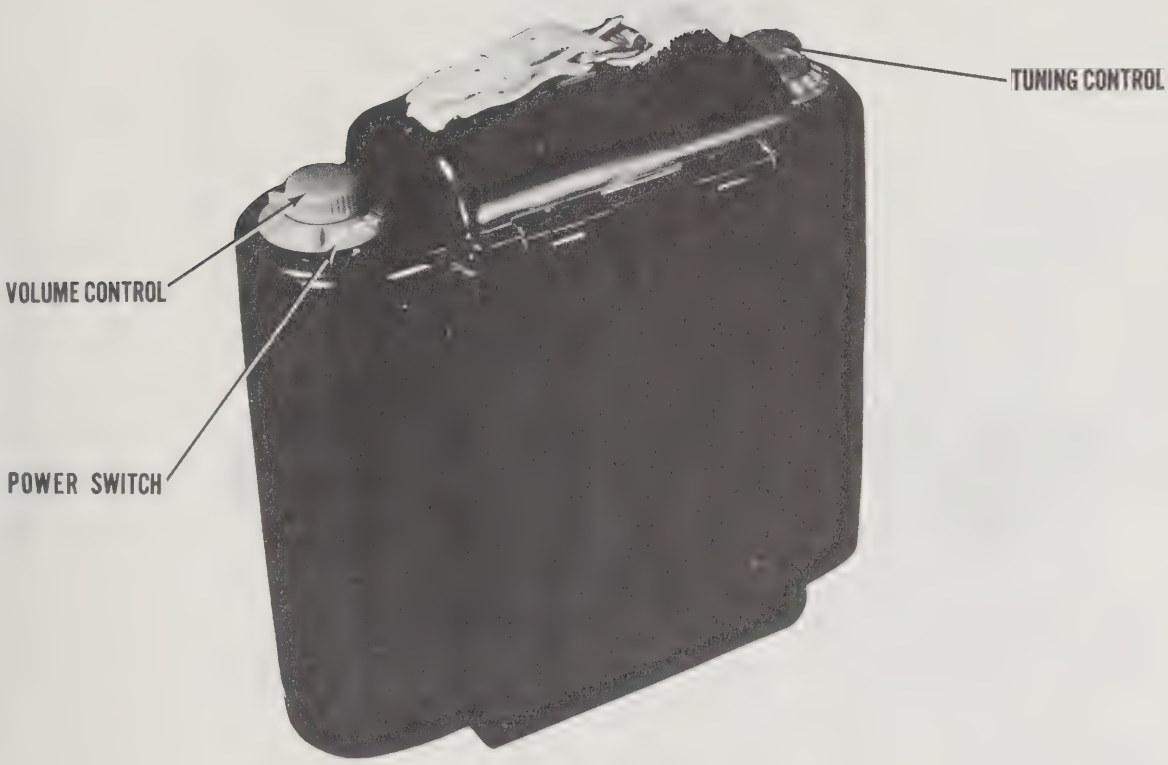
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

FIRESTONE (Air Chief) MODEL 4-C-5 (Code #291-7-574) BATTERY-LINE OPERATED

FIRESTONE (Air Chief) MODEL 4-C-5 (Code #291-7-574) BATTERY-LINE OPERATED



FIRESTONE (Air Chief) MODEL 4-C-5 (Code #291-7-574) BATTERY-LINE OPERATED

AIR CHIEF MODEL 4-C-5

TRADE NAME	Air Chief, Model 4-C-5 (Code 291-7-574)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1S5 Det.-AVC-AF, 3Q4 Power Output
POWER SUPPLY	110-120 Volts AC-DC or 1.5 Volts "A" Supply and 67.5 Volts "B" Supply
RATING	.12 Amp. @ 117 Volts AC or 230MA @ 1.5 Volts DC and 8.8MA @ 67.5 Volts DC
TUNING RANGE--BROADCAST	530-1620KC

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer exactly even with center of large 5 of the 55 calibration number at low frequency end of dial.

For Steps 1 & 2 remove receiver from cabinet and connect a 1 Meg. resistor across loop leads.

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.2 MFD.	High side to Pin 6 (grid) 1R5. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy ant. to 200 MMF to reduce hum modulation.
2	200MMFD	High side to grid side of 1 Meg. resistor (see prealignment notes). Low side to chassis.	1620KC	"	"	A5	Adjust for maximum output.
3		Loop	1400KC	Tune for maximum output.	"	A6	Install receiver in cabinet with loop upright. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Make certain that neither loop moves during this adjustment.

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DATE 2/48 SET #33 FOLDER #483-6

PARTS LIST AND DESCRIPTIONS

AIR CHIEF MODEL 4-C-5
BATTERY-LINE OPERATED

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIR CHIEF PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3Q4	3Q4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIR CHIEF PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	40	150	23E14	DSB-2x40-150	TA-440	PRSA150-40-40	BRD4415	Filter - Yellow
B	40	150						" - Red
6	100	10	23E12	M-100-12	UHC-112	PRS25-100	BRH121	Filament Bypass
7	.05	400	23E416	MPH-4-05	TC-15	484-05	DT4S5	Line Filter
8	.002	400		TTR-1.5-002		338T-002	ZZW1D2	Output Plate Bypass
9	.01	200	23E2014-6	TTR-1.5-01		338T-01	ZZW1S1	Audio Coupling
10	.01	200	23E2014-6	TTR-1.5-01		338T-01	ZZW1S1	AF Screen Bypass
11	.01	200	23E2014-6	TTR-1.5-01		338T-01	ZZW1S1	Audio Coupling
12	.01	200	23E2014-6			338T-01	ZZW1S1	IF Screen Bypass
13	.1	200		TTR-1.5-1				Filament Bypass
14	.1	200		TTR-1.5-1				" "
15	.01	200	23E2014-6	TTR-1.5-01		338T-01	ZZW1S1	Osc. Feedback
16	.05	200		TTR-1.5-05				AVC Filter
17	.05	200		TTR-1.5-05				" "
18	.1	200		TTR-1.5-1				Tuning Cap. Isolation
19	100		23E9					Output Grid Bypass-Cer.
20	100		23E9					Diode RF Filter-Cer.
21	100		23E9					Osc. Grid Cap.-Cer.
22	25		23E8					Fixed Trimmer-Cer.

CONTROLS

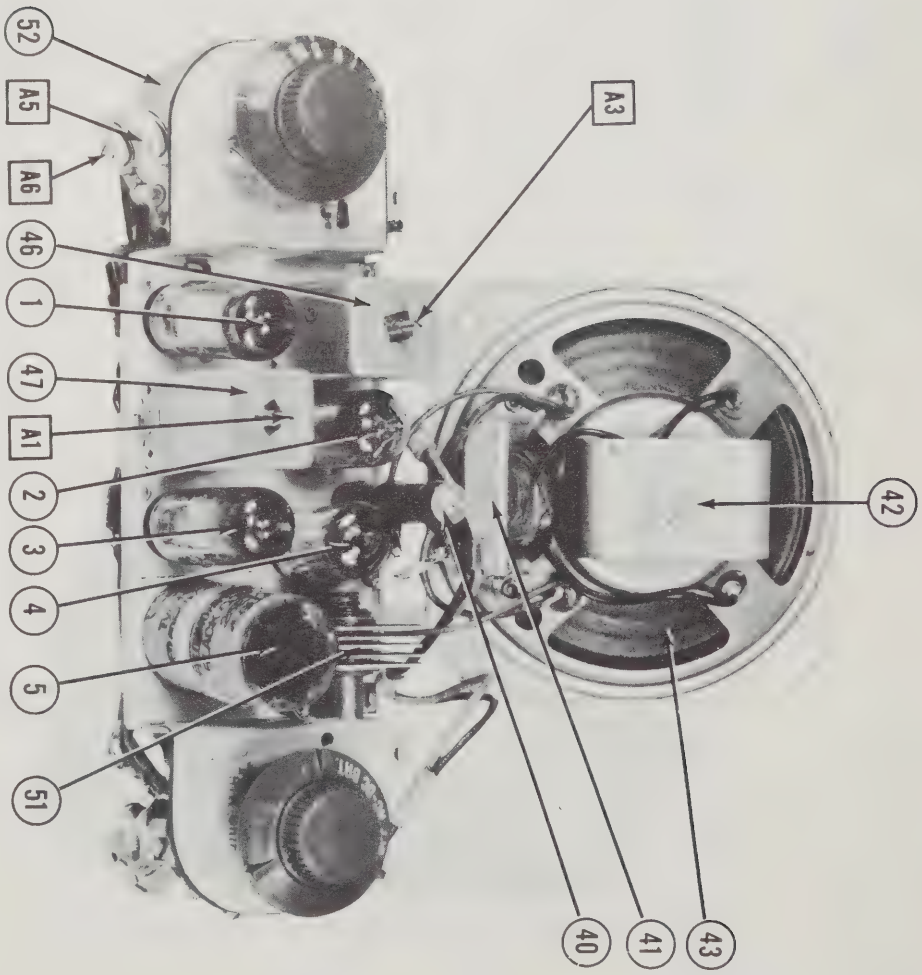
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR CHIEF PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
23	2 Meg.	2	28E16			Volume Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR CHIEF PART No.	IRC PART No.	IDENTIFICATION CODES
24	470Ω	¼	27E471-7	BTS-470	Yl.-Vi.-Br. Filament String
25	68KΩ	¼	27E683-7	BTS-68K	Blue-Gray-Or. Oscillator Grid
26	6800Ω	¼	27E682-7	BTS-6800	Blue-Gray-Red Converter Screen
27	470KΩ	¼	27E474-7	BTS-470K	Yl.-Vi.-Yl. AVC Network
28	4.7 Meg.	¼	27E475-7	BTS-4.7 Meg	Yl.-Vi.-Grn. AVC Network
29	4.7 Meg.	¼	27E475-7	BTS-4.7 Meg	Yl.-Vi.-Grn. AVC Network
30	10 Meg.	¼	27E106-7	BTS-10 Meg.	Br.-Blk.-Blue AVC Network
31	560Ω	¼	27E561-7	BTS-560	Grn.-Blue-Br. Filament String
32	22KΩ	¼	27E223-7	BTS-22K	Red-Red-Or. IF Screen Dropping
33	4.7 Meg.	¼	27E475-7	BTS-4.7 Meg	Yl.-Vi.-Grn. AF Grid
34	4.7 Meg.	¼	27E475-7	BTS-4.7 Meg	Yl.-Vi.-Grn. AF Screen Dropping
35	1 Meg.	¼	27E105-7	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
36	100Ω	¼	27E101-7	BW-½-100	Br.-Blk.-Br. Bias
37	270Ω	¼	27E271-7	BW-½-270	Red-Vi.-Br. Bias
38	1 Meg.	¼	27E105-7	BTS-1 Meg.	Br.-Blk.-Grn. Output Grid
39	68Ω	½	27E680-2	BW-½-68	Blue-Gray-Blk. Surge Limiter
40A	1750Ω	10	27E1003	ABA-2000	Filament Dropping-See Note 1
B	610Ω			ABA-750	" " " " 2

Note 1 - On IRC replacement set slider @ 1750Ω from one end.
Note 2 - On IRC replacement set slider @ 610Ω from one end.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIR CHIEF PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
41	6500Ω	3.0Ω	330Ω	.3Ω				A-2998	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIR CHIEF PART No.	JENSEN PART No.		
42	FIELD PM	VC IMP. 3.0Ω	1E20	ST-113 Mod. P4-X		
43	CONE DIA. 4"	VC DIA. 1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	AIR CHIEF PART No.	MEISSNER PART No.	
44	Loop Ant.		7.1Ω	20E145-1		Includes door, name color.
45	Osc. Coil	1.3Ω	3.5Ω	20E300		
46	Input IF	22Ω	20.8Ω	20E299-2	16-6668	
47	Output IF	22Ω	20.8Ω	20E299-2	16-6669	

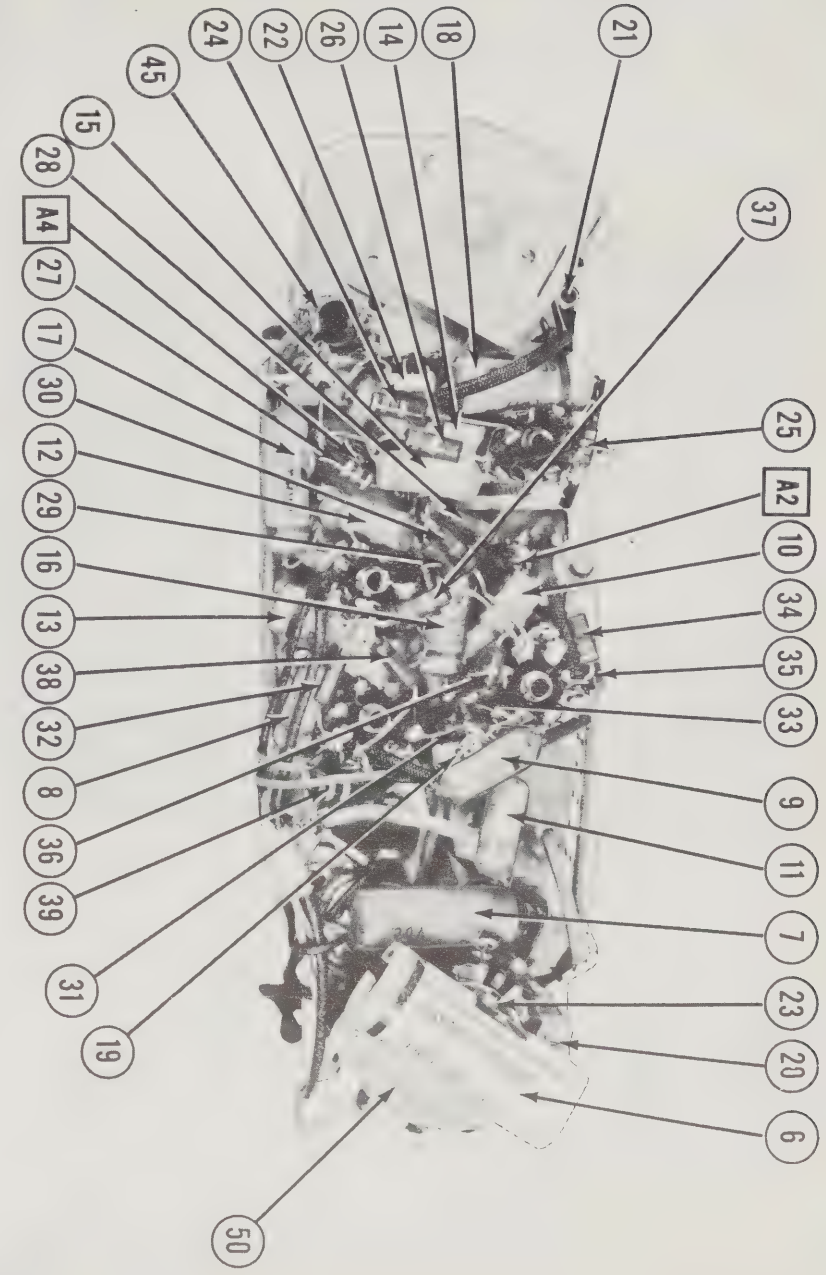
BATTERIES

ITEM No.	VOLTAGE	AIR CHIEF PART No.	EVEREADY			INSTALLATION NOTES
			"A"	"B"	"A-B"	
48	1.5V "A"	7-C-1	#950			2 Used in Parallel
49	67.5V "B"	4-D-84		#467		

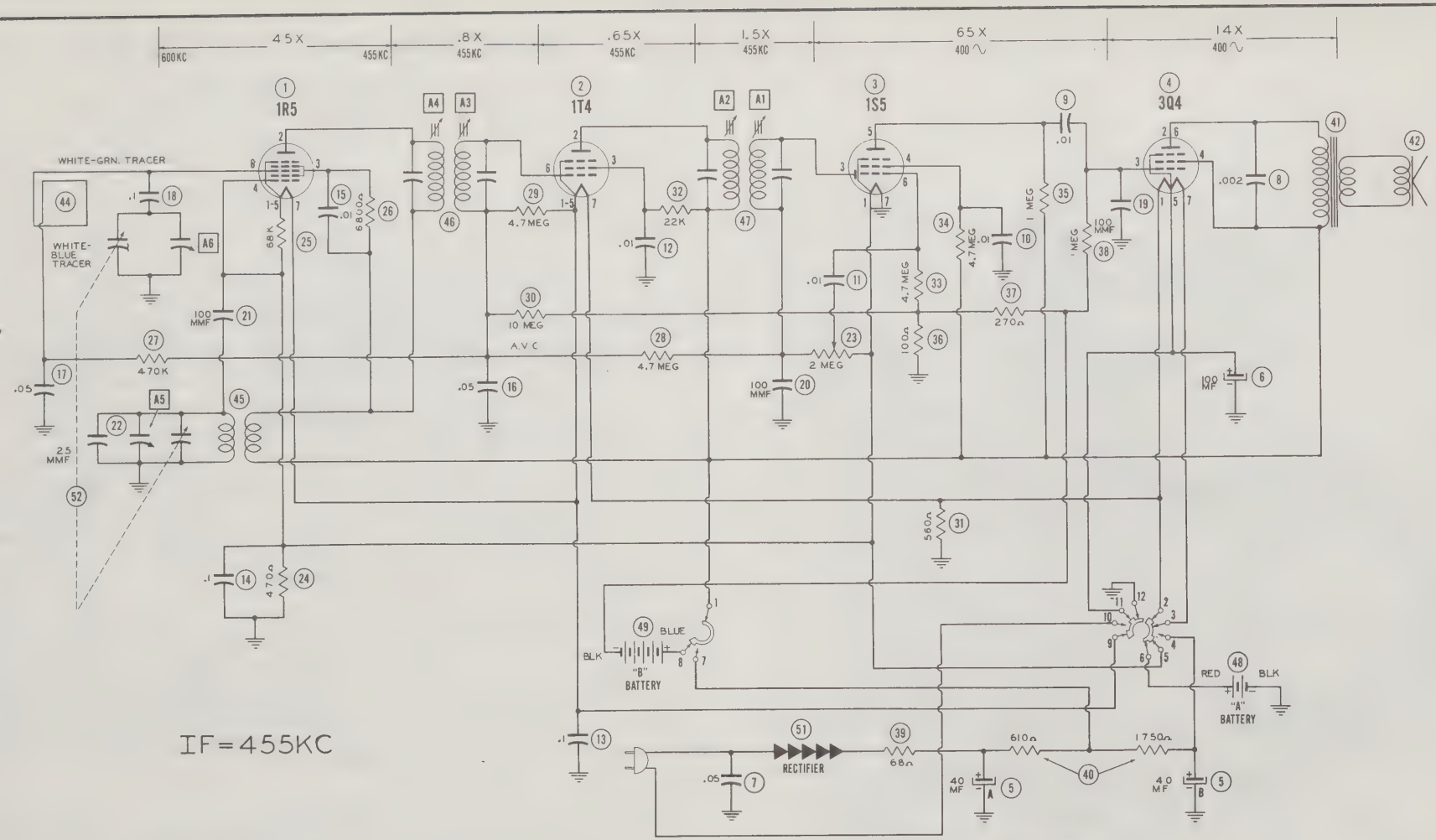
MISCELLANEOUS

ITEM No.	PART NAME	AIR CHIEF PART No.	NOTES
50	Switch	29E12	On-off, AC-DC, Batt.
51	Rectifier	57E1-2	Selenium
52	2 Gang Var. Cap.	24E22	(20-497MMF, 19-290MMF)

CHASSIS—BOTTOM VIEW



AIR CHIEF MODEL 4-C-5
BATTERY-LINE OPERATED



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	1.3VDC	87VDC	70VDC	-11.5VDC$	1.3VDC	0V.	2.7VDC
2	1T4	2.7VDC	87VDC	70VDC	0V.	2.7VDC	.05VDC	3.9VDC
3	1S5	1.3VDC	0V.	.8VDC	2.4VDC	14.2VDC	0V.	0V.
4	3Q4	3.9VDC	85VDC	0V.	87VDC	5.2VDC	85VDC	6.4VDC

$TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	2KΩ	8KΩ	68KΩ	*	3 Meg.	*
2	1T4	*	2KΩ	24KΩ	390Ω	*	2.5 Meg.	*
3	1S5	*	100Ω	2 Meg.	5 Meg.	1 Meg.	1 Meg.	*
4	3Q4	*	2KΩ	950KΩ	2KΩ	*	1K.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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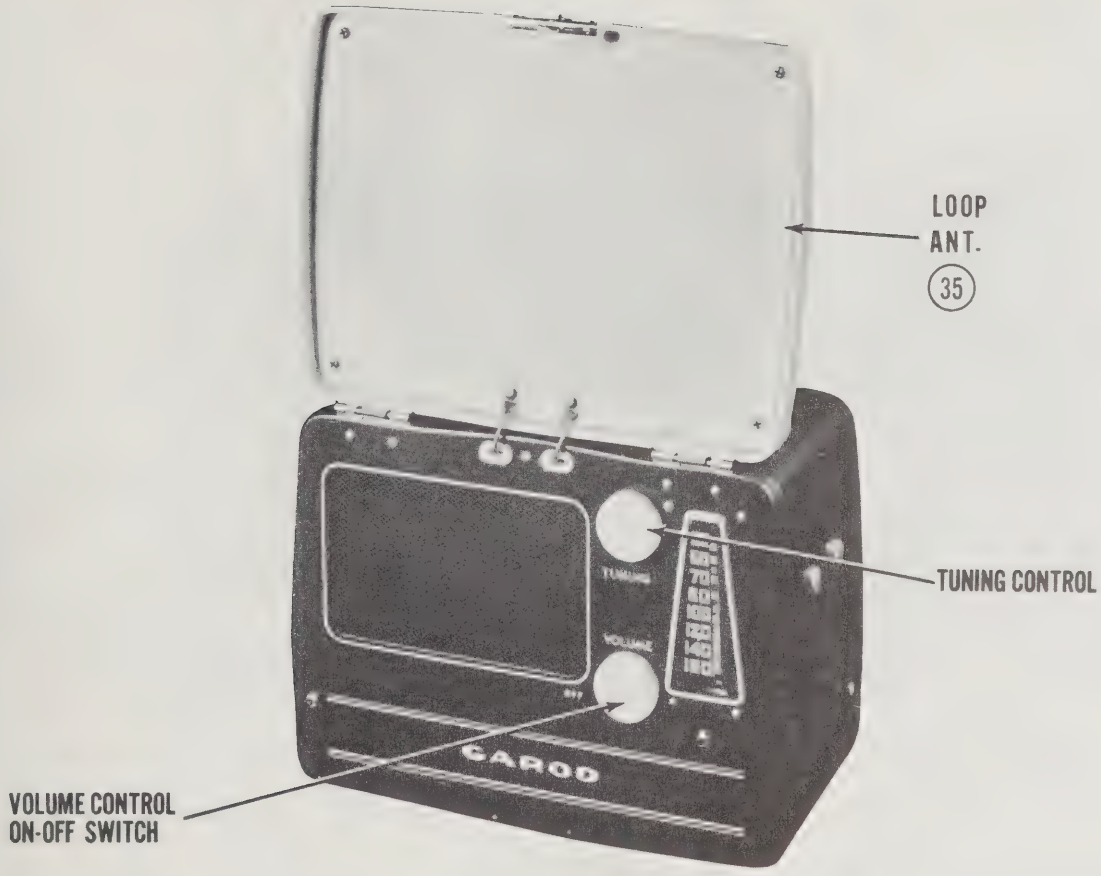
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to low side volume control.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

GAROD MODELS 5D-4, 5D-5
BATTERY-LINE OPERATED



GAROD MODELS 5D-4, 5D-5
BATTERY-LINE OPERATED

GAROD MODEL 5D-5

TRADE NAME	Garod, Models 5D-4, 5D-5
MANUFACTURER	Garod Radio Corp., 70 Washington St., Brooklyn, N.Y.
TYPE SET	Three Power Operated Portable Superheterodyne with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1S5 Det.-AVC-AF, 3S4 Power Output.
POWER SUPPLY RATING	105-125 Volts AC-DC or 7.5 Volts "A" Supply and 67.5 Volts "B" Supply .14 Amps. @ 117 Volts AC or 60MA @ 7.5 Volts DC and 7.3MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Extend loop leads and connect across rear section of tuning cap. Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMF. to reduce hum modulation.
2		Loop	1650KC	"	"	A5	Install receiver in cabinet and connect loop. Remove two plugs from end of cabinet making trimmer adjustments accessible. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output. Replace plugs in end of cabinet.

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DATE 2/48 SET #33 FOLDER #483-7

PARTS LIST AND DESCRIPTIONS

GAROD MODELS 5D-4, 5D-5
BATTERY-LINE OPERATED

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		GAROD PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3S4	3S4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	GAROD PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	
5A	25	150	5.415-3			PRSA-503010	UP6CJ64		Filter - Yl.
B	60	150							" - Red
C	150	25							Filament Bypass-Blue
6	.05	400		MPH-4-05	TC-15	484-05	DT4S5		Line Filter
7	.005	600		S-6-005	TC-25	684-005	DT6D5		Output Plate Bypass
8	.01	400		S-4-01	TC-11	484-01	DT4S1		Audio Coupling
9	.1	200		S-2-1	TC-1	484-.1	DT2P1		AF Plate Decoupling
10	.05	400		S-4-05	TC-15	484-05	DT4S1		AF Screen Bypass
11	.01	400		S-4-01	TC-11	484-01	DT4S1		Audio Coupling
12	.02	200		S-4-02	TC-12	484-02	DT2S2		AVC Filter
13	.01	400		S-4-01	TC-11	484-01	DT4S1		Screen Bypass
14	.05	400		S-4-05	TC-15	484-05	DT4S5		Filament Bypass
15	47			MO.5-45	1FM-45	1468-00005	5W5J5		AF Plate Bypass
16	100			MO.5-31	1FM-31	1468-0001	5W5T1		Diode RF Filter

CONTROLS

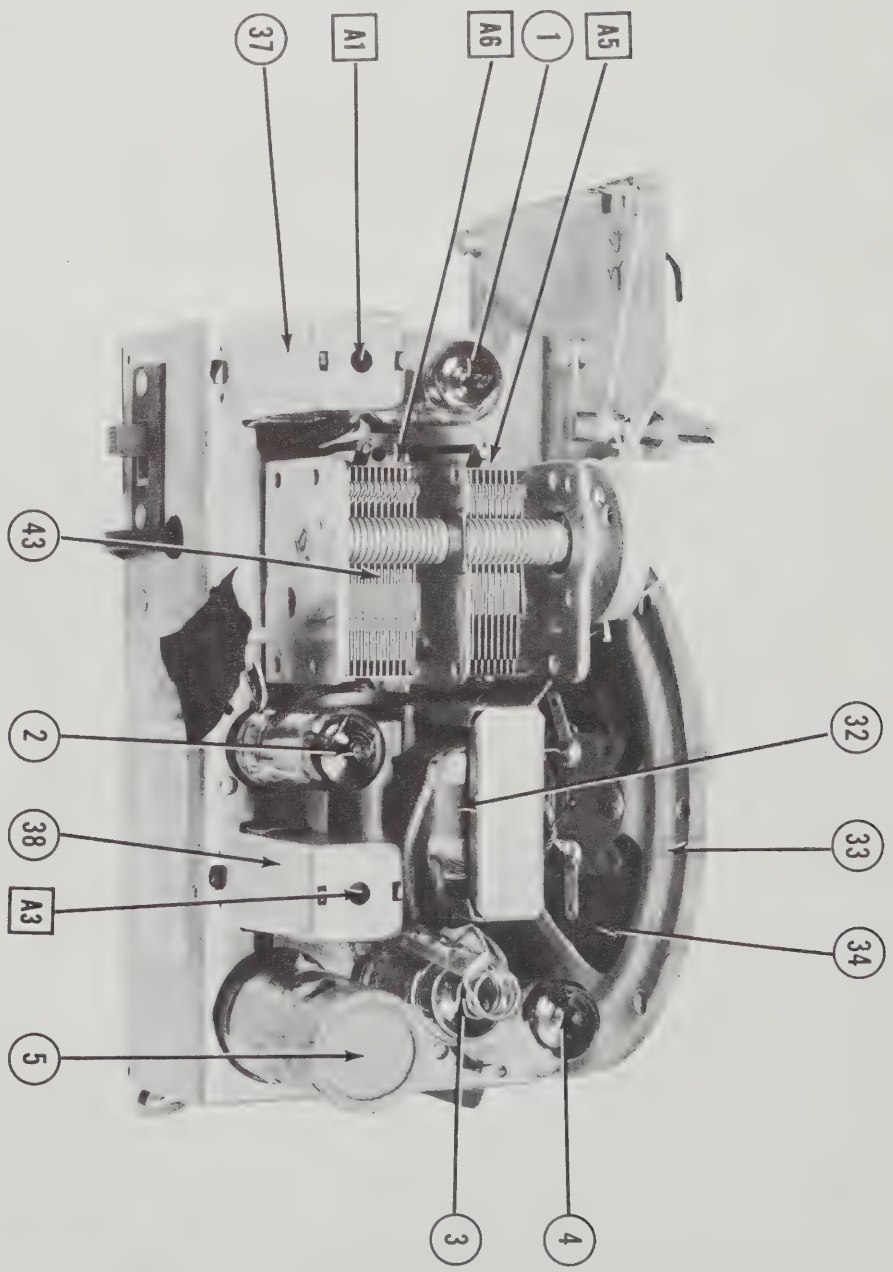
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	GAROD PART No.	IRC PART No.	CLAROSTAT PART No.	
17A	1 Meg.	½	8.200-2	D13-137*	AM-63-Z*	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 17A per instructions
C	Switch		" "	42	SW-A2	" " " " "

*Install a 47KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Controls viewed from shaft side, terminals down.)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GAROD PART No.	IRC PART No.	
18	100KΩ	¼		BTS-100K	Br.-Blk.-Yl. Oscillator Grid
19	4700Ω	¼		BTS-4700	Yl.-Vi.-Red Screen Dropping
20	1 Meg.	¼		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
21	10 Meg.	¼		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
22	4.7 Meg.	¼		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen Dropping
23	1 Meg.	¼		BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
24	220KΩ	¼		BTS-220K	Red-Red-Yl. AF Plate Decoupling
25	2.2 Meg.	¼		BTS-2.2 Meg.	Red-Red-Grn. Output Grid
26	270Ω	¼		BW-½-270	Red-Vi.-Br. Bias
27	680Ω	¼		BTS-680	Blue-Gray-Br. Filament String
28	470Ω	¼		BTS-470	Yl.-Vi.-Br. Filament String
29	1000Ω	¼		BTS-1000	Br.-Blk.-Red Filament String
30A	1210Ω	10	6.208-1		Filament Dropping
B	540Ω				Filament Dropping
31	100Ω	1		BW-1-100	Br.-Blk.-Br. Surge Limiter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		GAROD PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
32	5000Ω	3.4Ω	380Ω	.5Ω	Part of 30.312	A-3877†	T22S46†	A-2930†	†Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			GAROD PART No.	JENSEN PART No.		
33	FIELD PM	VC IMP. 3.4Ω	30.312	ST-107 Mod. P5-V		
34	CONE DIA. 4-3/4"	VC DIA. 1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

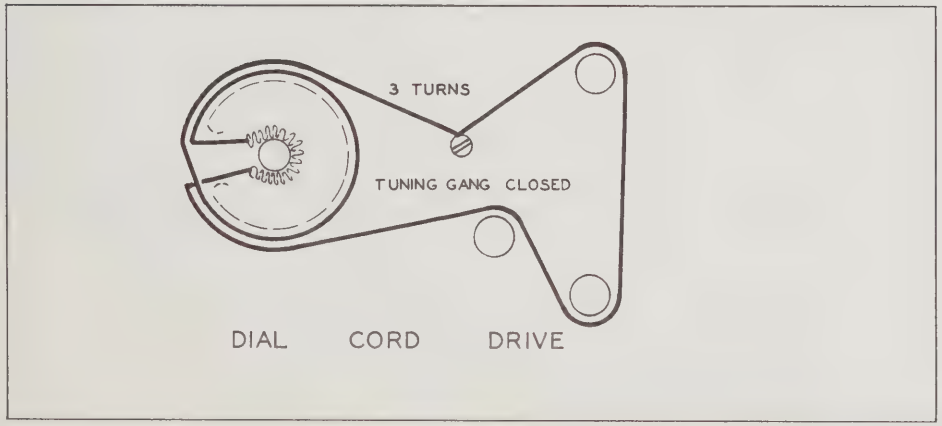
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	GAROD PART No.	MEISSNER PART No.	
35	Loop Ant.		2.5Ω	1.437		
36	Osc. Coil	2Ω	6.6Ω	1.414	14-1040‡	‡Add 50MMF from high side tuning cap. to osc. grid
37	Input IF	21.8Ω	21.8Ω	1.445-4	16-6668	
38	Output IF	20.2Ω	20.1Ω	1.445-2	16-6669	

BATTERIES

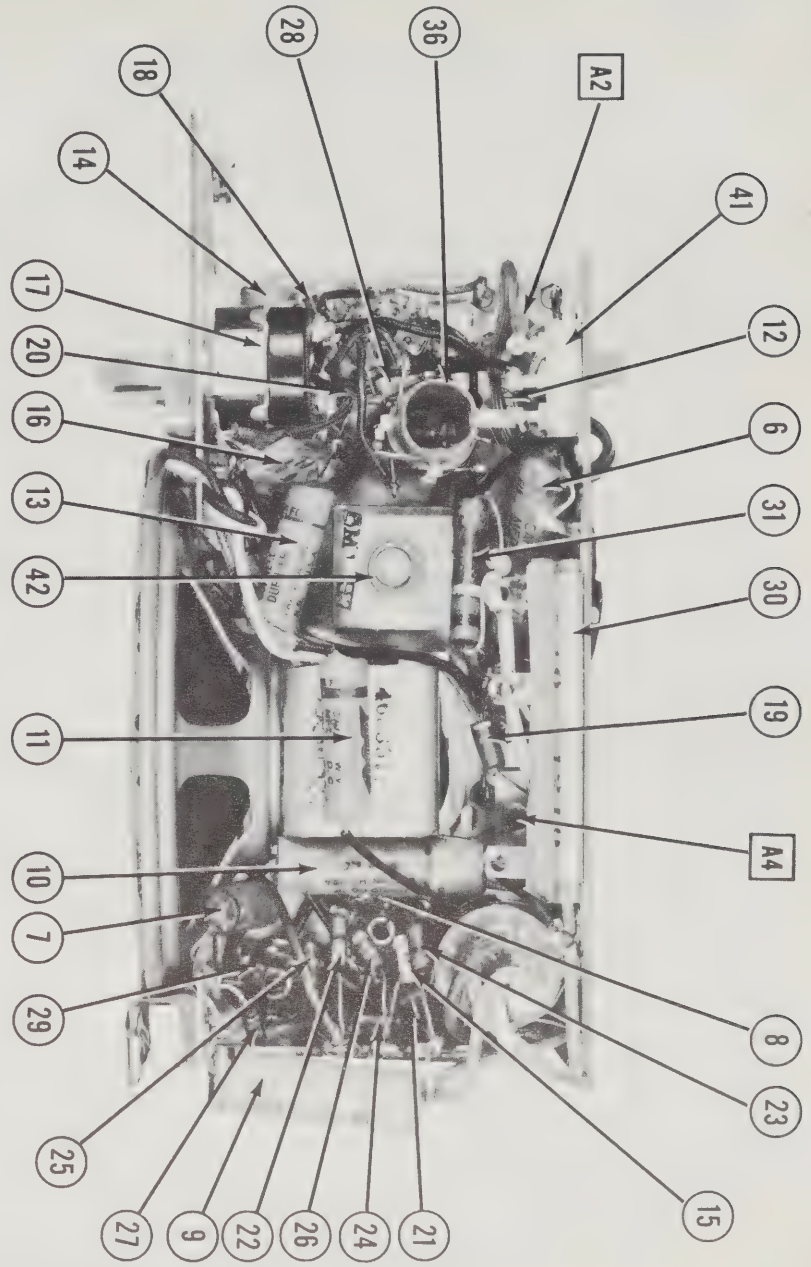
ITEM No.	VOLTAGE	GAROD PART No.	EVEREADY			INSTALLATION NOTES
			"A"	"B"	"A-B"	
39	7.5V "A"		#950			5 Used in series
40	67.5V "B"			#467		

MISCELLANEOUS

ITEM No.	PART NAME	GAROD PART No.	NOTES
41	Switch	11.210	AC-DC-Batt.
42	Rectifier	36.111	Selenium
43	2 Gang Var. Cap.	2.210	(21-405MMF, 31-196MMF)



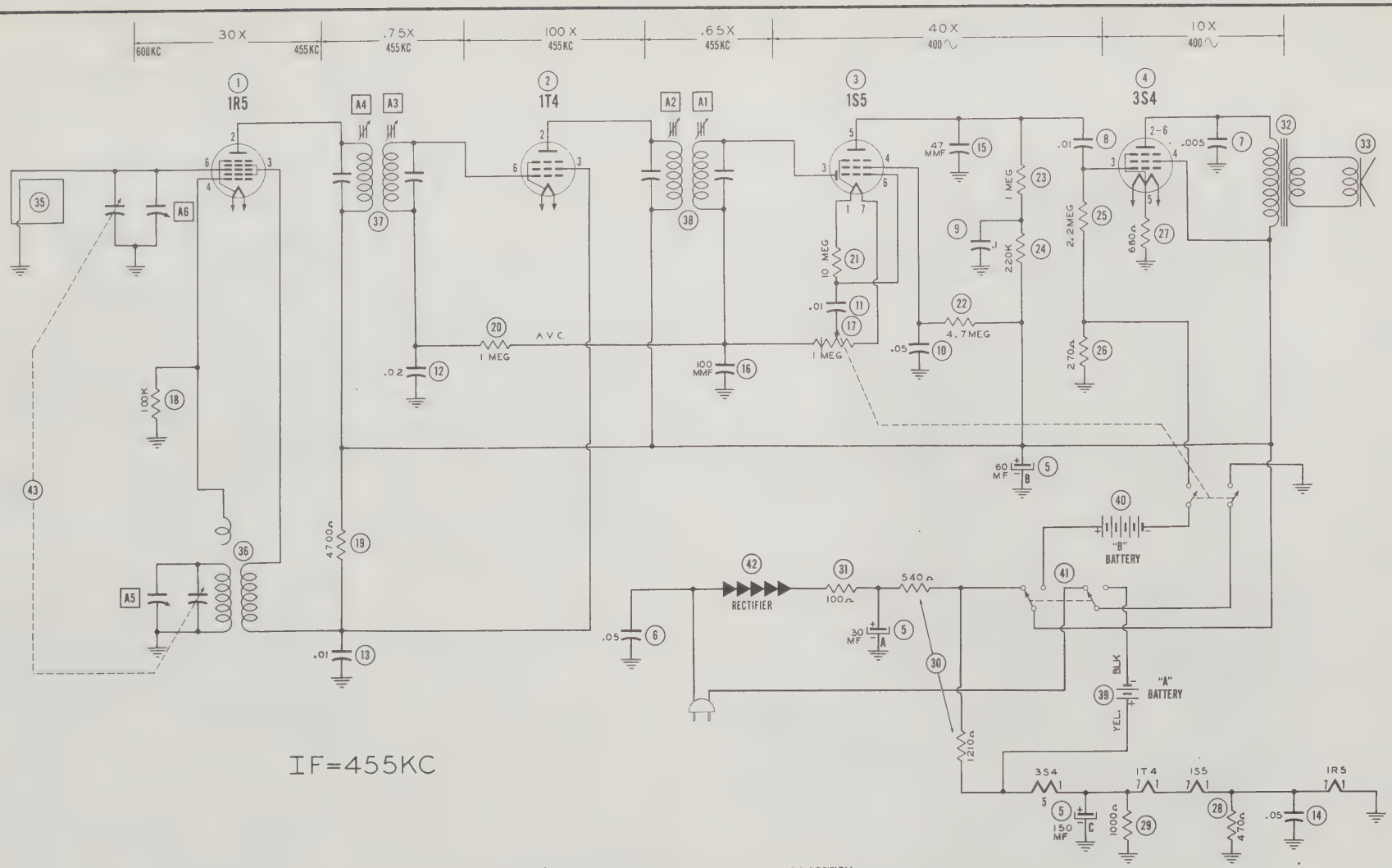
CHASSIS—BOTTOM VIEW



DATE 2/48 SET #33 FOLDER #483-7

GAROD MODELS SD-4, SD-5
BATTERY-LINE OPERATED

GAROD MODELS SD-4, SD-5
BATTERY-LINE OPERATED



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	.75VDC	57VDC	13VDC§	0V.	0V.	1.5VDC
2	1T4	3VDC	78VDC	57VDC	0V.	3VDC	.15VDC	4.5VDC
3	1S5	1.5VDC	0V.	.5VDC	12.5VDC	14VDC	0V.	3VDC
4	3S4	4.5VDC	70VDC	0V.	75VDC	4.9VDC	70VDC	7.3VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	1KΩ	5.7KΩ	100KΩ	0Ω	2.5Ω	*
2	1T4	*	1KΩ	5.7KΩ	INF.	*	2.5 Meg.	*
3	1S5	*	300Ω	1 Meg.	5 Meg.	1.3 Meg.	10 Meg.	*
4	3S4	*	1KΩ	2.2 Meg.	1KΩ	*	1KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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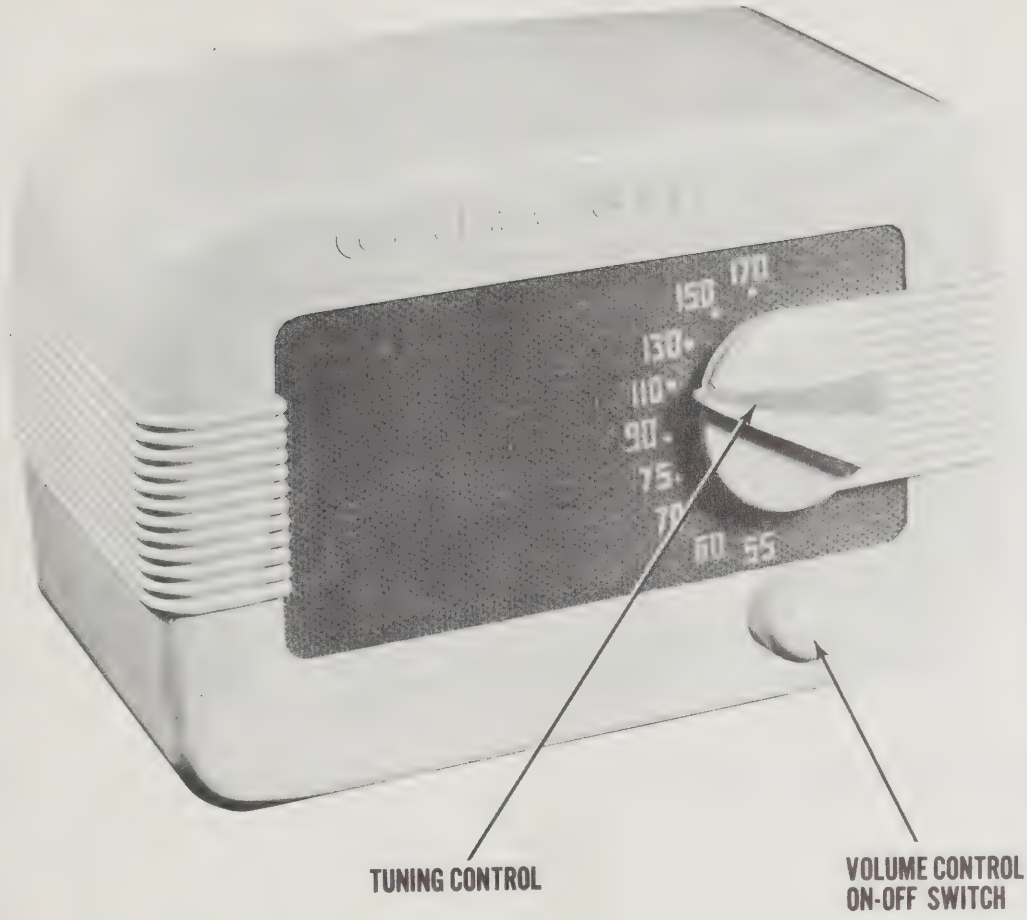
483-7

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to low side volume control.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

GENERAL ELECTRIC MODELS
YRB-60-1, YRB-60-2, YRB-60-12



GENERAL ELECTRIC MODELS
YRB-60-1, YRB-60-2, YRB-60-12

GENERAL ELECTRIC MODEL YRB-60-12

TRADE NAME	General Electric Models YRB-60-1, YRB-60-2, YRB-60-12
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Ant.
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1725KC RATING .24 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

RMA Dummy Ant. consists of 200MMFD cap. in series with 20 microhenry choke with the choke shunted by 400MMFD cap. and 400Ω carbon resistor.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	RMA Dummy	High side to ext. ant. lead. Low side to chassis.	1725KC	"	"	A5	Adjust for maximum output.
3	RMA Dummy	"	1500KC	Tune for maximum output.	"	A6	" " " "

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DATE 2/48 SET #33 FOLDER #483-8

PARTS LIST AND DESCRIPTIONS

GENERAL ELECTRIC MODELS
YRS-60-1, YRE-60-[illegible], YRF-60-12

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GEN. ELECT. PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	SCE-003	DSB-2x40-150	TA-440	PRSA150-40-40	EDL4415	Filter - Red
B	40	150						" - Blue
7	.05	600	UCC-045	MPH-6-05	TC-15	684-05	DT6S5	Line Filter
8	.05	600	UCC-045	S-6-05	TC-15	684-05	DT6S5	RF Bypass Pwr. Supply
9	.02	600	UCC-041	S-6-02	TC-12	684-02	DT6S2	Output Plate Bypass
10	.01	600	UCC-040	S-6-01	TC-11	684-01	DT6S1	Audio Coupling
11	.005	600	UCC-039	S-6-005	TC-25	684-005	DT6D5	" "
12	.05	600	UCC-045	S-6-05	TC-15	684-05	DT6S5	AVC Filter
13	.01	600	UCC-040	S-6-01	TC-11	684-01	DT6S1	Ant. Coupling
14	330		UCU-1040	MO.5-33	1FM-33	1468-0003	5W5T3	AF Plate Bypass
15	330		UCU-1040	MO.5-33	1FM-33	1468-0003	5W5T3	Diode RF Filter
16	47		UCU-1020	MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.*

*Not used in some models.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GEN. ELECT. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
17A	500KΩ	½	SRC-004	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

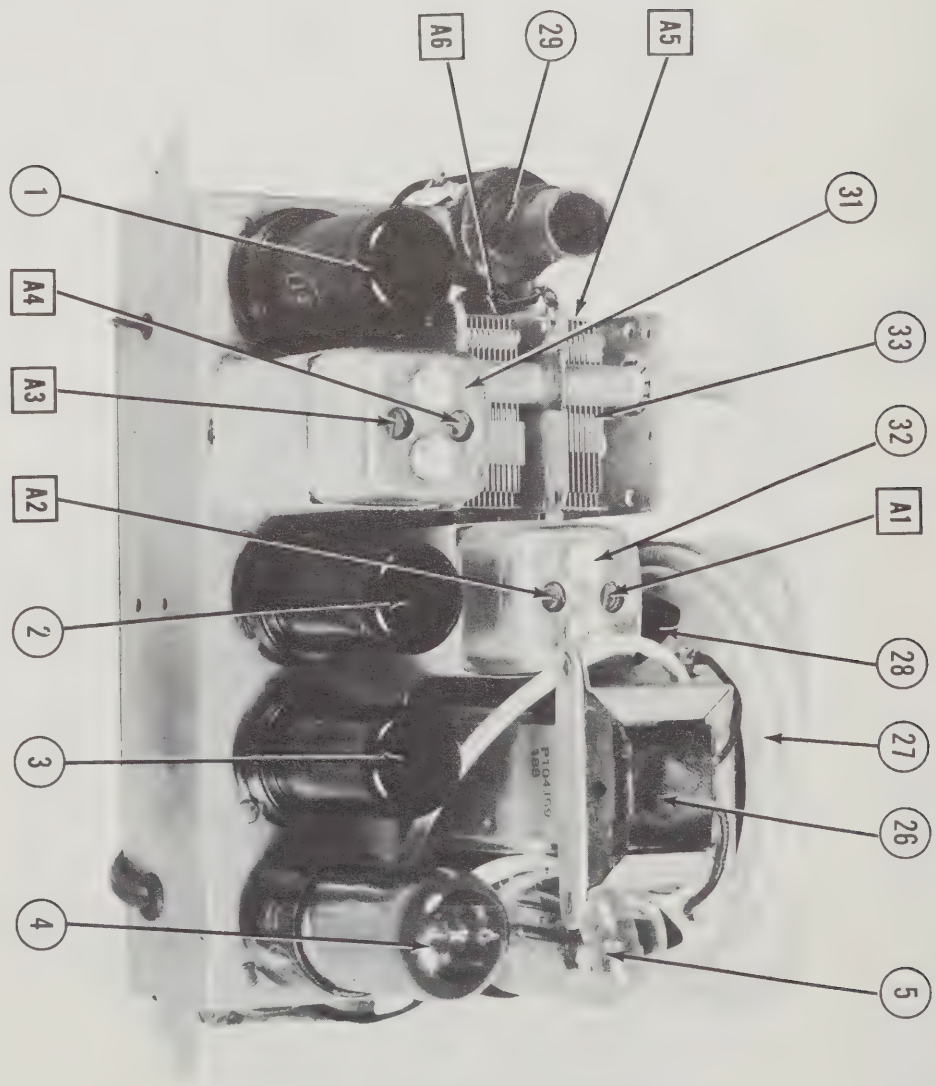
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GEN. ELECT. PART No.	IRC PART No.	IDENTIFICATION CODES
18	22KΩ	¼	URD-081	BTS-22K	Red-Red-Or. Oscillator Grid
19	2.2 Meg.	¼	URD-129	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
20	10 Meg.	¼	URD-145	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
21	220KΩ	¼	URD-105	BTS-220K	Red-Red-Yl. AF Plate Load
22	470KΩ	¼	URD-113	BTS-470K	Yl.-Vi.-Yl. Output Grid
23	150Ω	½	URD-029	BW-½-150	Br.-Grn.-Br. Output Cathode
24	1500Ω	2	URF-053	BT-2-1500	Br.-Grn.-Red Filter
25	18Ω	½	URE-007	BW-½-18	Br.-Gray-Blk. Rectifier Ballast

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: GEN. ELECT. PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
26	2000Ω	3.6Ω	160Ω	.6Ω		A-3576	T32S45	A-2928	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: GENERAL ELECTRIC PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-113†		†Fabricate new mounting bracket.
27	PM	3.6Ω	SOP-001	Mod. P4-X		
	CONE DIA.	VC DIA.				
28	4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER			

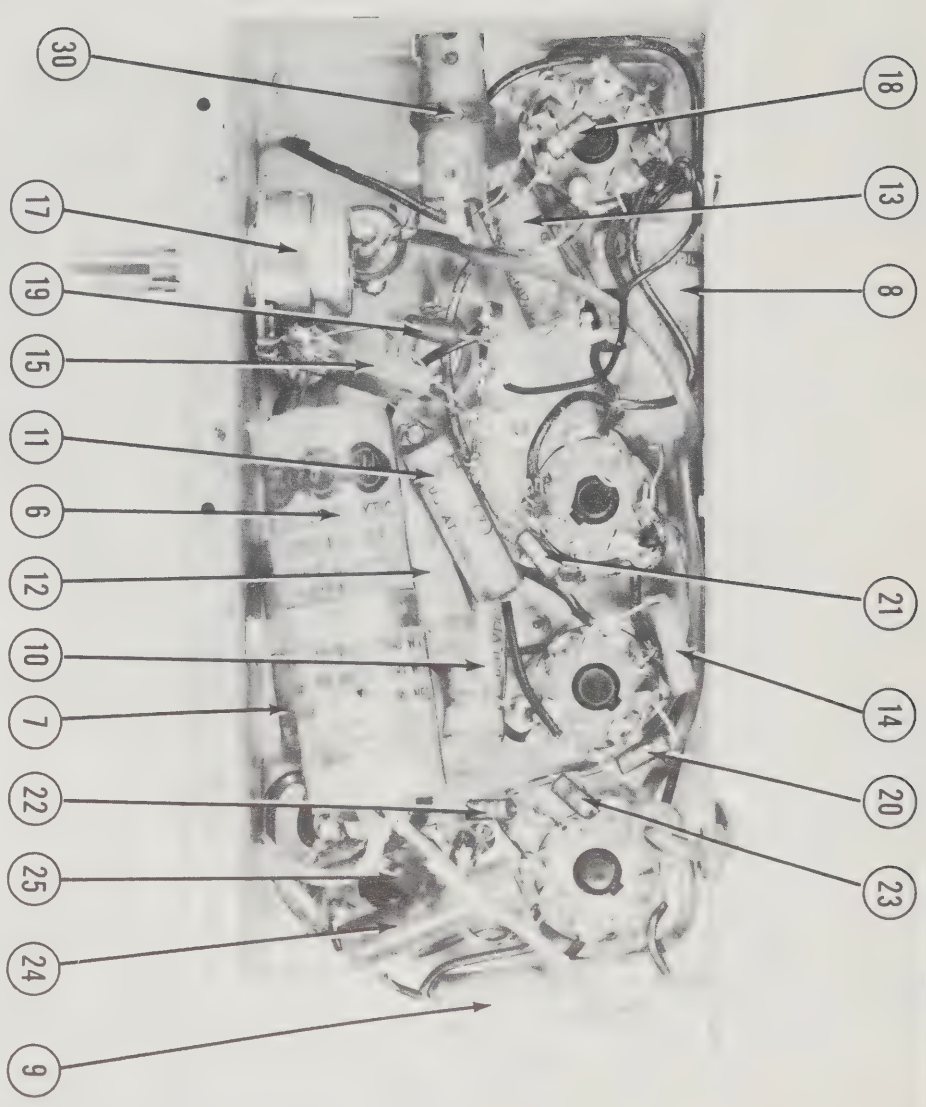
R F COILS

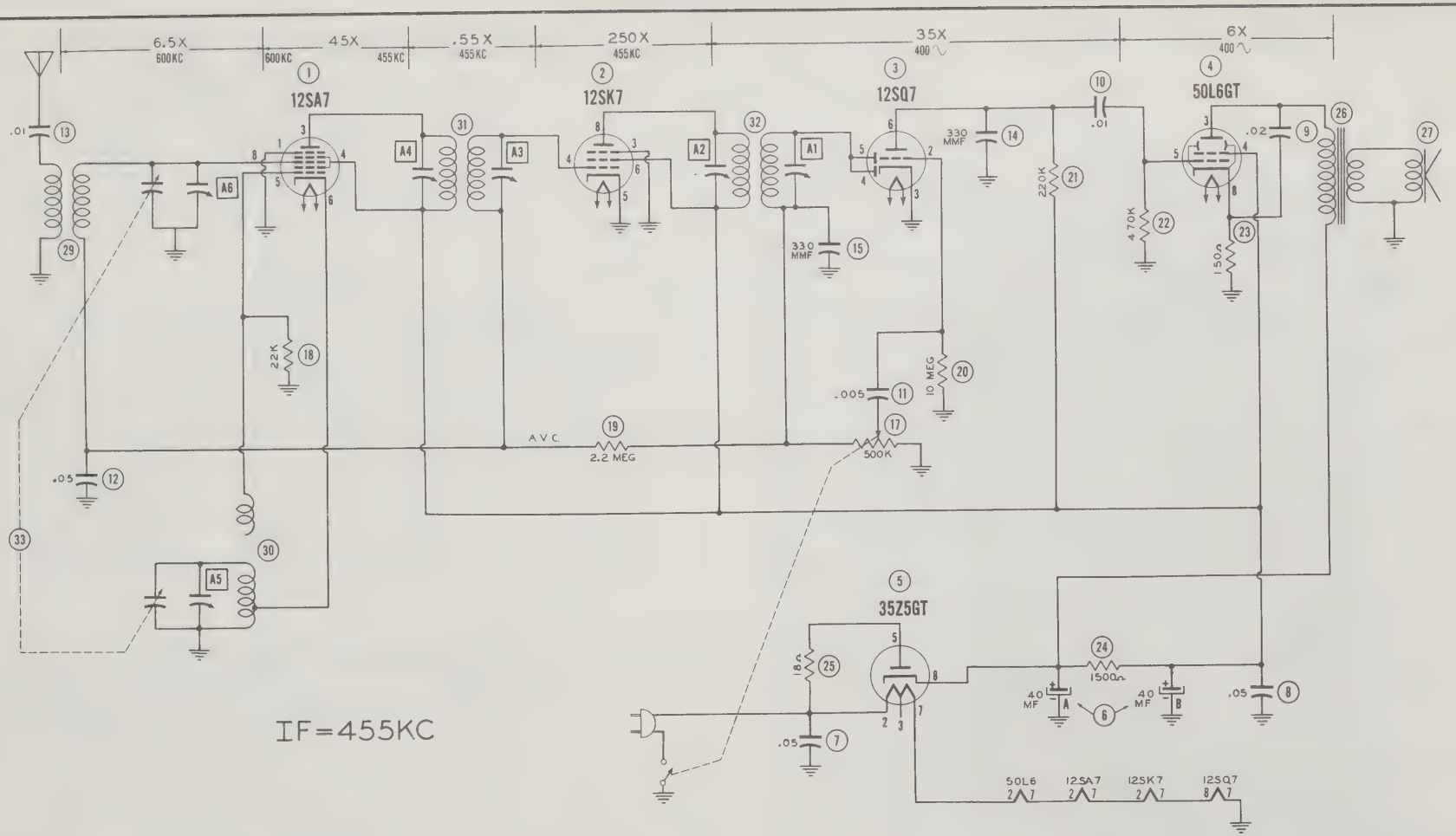
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: GEN. ELECT. PART No.	MEISSNER PART No.	
29	Ant. Coil	52Ω	5Ω	SLA-001	14-1026	
30	Osc. Coil		6Ω	SLC-002	14-1040‡	‡Add 50MMF. from high side of tuning cap to osc. grid.
31	Input IF	18.5Ω	20Ω	STL-003	16-6658	
32	Output IF	30Ω	31.5Ω	STL-004	16-6660	

MISCELLANEOUS

ITEM No.	PART NAME	GEN. ELECT. PART No.	NOTES
33	2 Gang Var.Cap.	SCT-003	(33-467MMF, 21-187MMF)

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	24VAC	90VDC	90VDC	-10VDC§	0V.	36VAC	-.7VDC
2	12SK7	0V.	24VAC	0V.	-.7VDC	0V.	90VDC	12VAC	90VDC
3	12SQ7	0V.	-.6VDC	0V.	-.4VDC	-.4VDC	57VDC	12VAC	0V.
4	50L6GT	0V.	84VAC	125VDC	90VDC	0V.	5VDC	36VAC	5VDC
5	35Z5GT	0V.	117VAC	117VAC	0V.	116VAC	0V.	84VAC	125VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0Ω	25Ω	25KΩ	25KΩ	24KΩ	.5Ω	36Ω	3 Meg.
2	12SK7	0Ω	25Ω	0Ω	3 Meg.	0Ω	25KΩ	15.5Ω	25KΩ
3	12SQ7	0Ω	10 Meg.	0Ω	500KΩ	500KΩ	295KΩ	12.5Ω	0Ω
4	50L6GT	INF.	85Ω	25KΩ	25KΩ	500KΩ	170Ω	36Ω	170Ω
5	35Z5GT	INF.	115Ω	105Ω	INF.	117Ω	INF.	85Ω	25KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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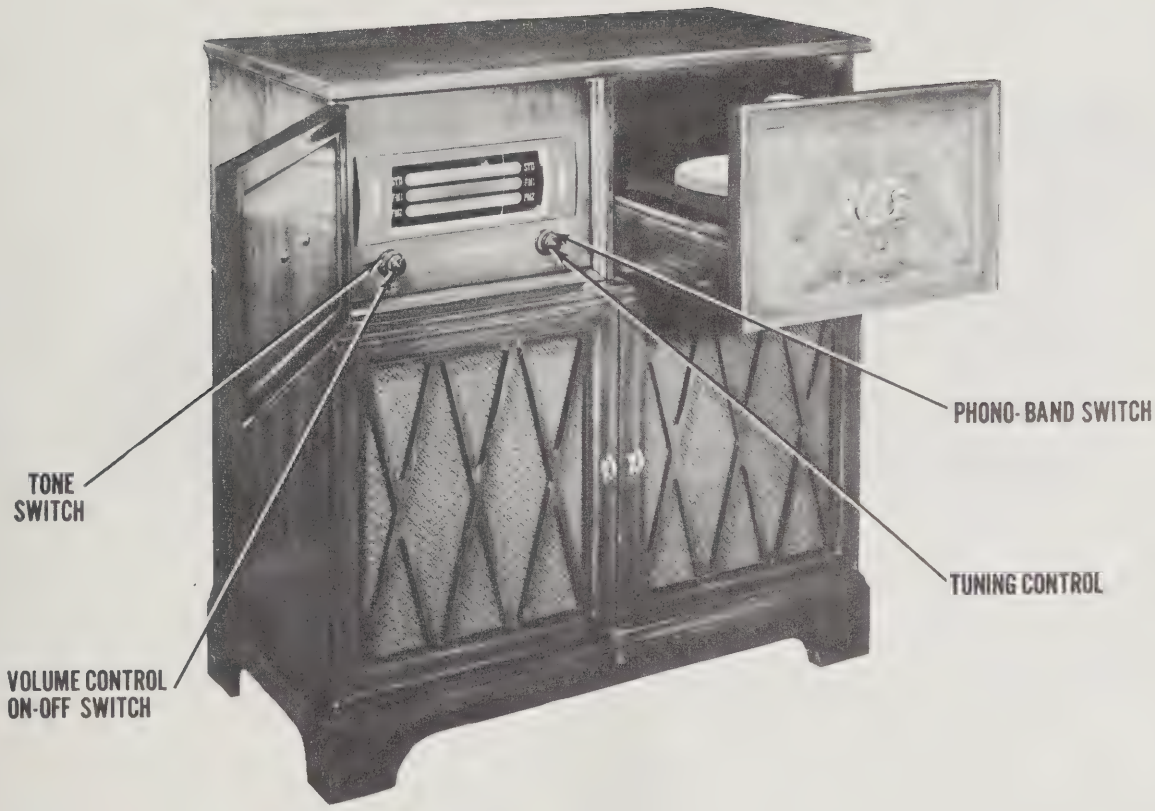
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

GENERAL ELECTRIC
MODELS 354, 355



GENERAL ELECTRIC
MODELS 354, 355 PAGE 1

GENERAL ELECTRIC MODELS 354, 355			
TRADE NAME	General Electric, Model 354, 355		
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.		
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver with Loop Ant.		
TUBES (NINE)	Types, 6BA6 Mixer, 6C4 Osc., 6BA6 IF Amp., 6SH7 IF Amp.-AM Det.-AVC, 6AL5 FM Ratio Det., 6SC7 Phono Pre-Amp., 6SC7 AF Amp., 6V6GT Power Output, 5Y3GT Rectifier.		
POWER SUPPLY	110-120 Volts AC	RATING	.60 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC	FREQ. MOD.	42-49MC, 88-108MC

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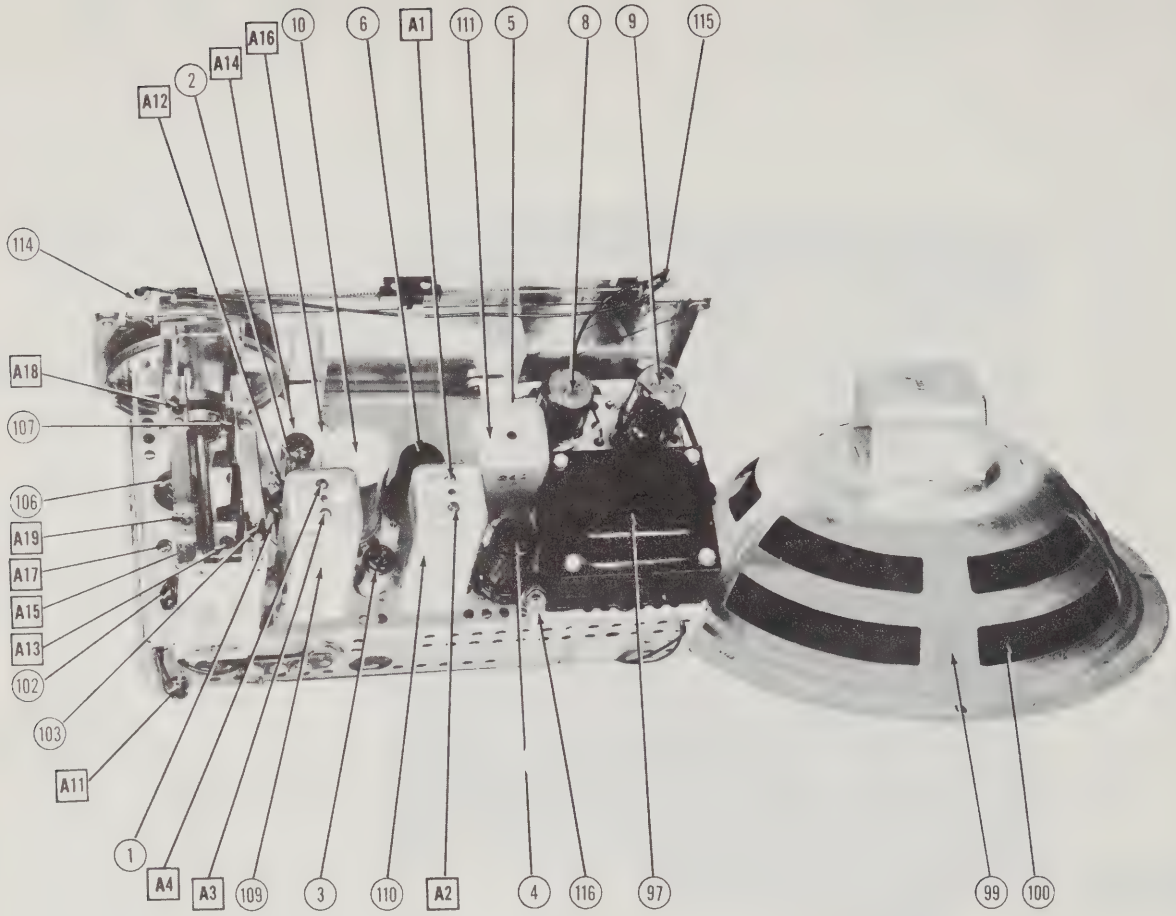
DATE 2/48 SET #33 FOLDER #483-9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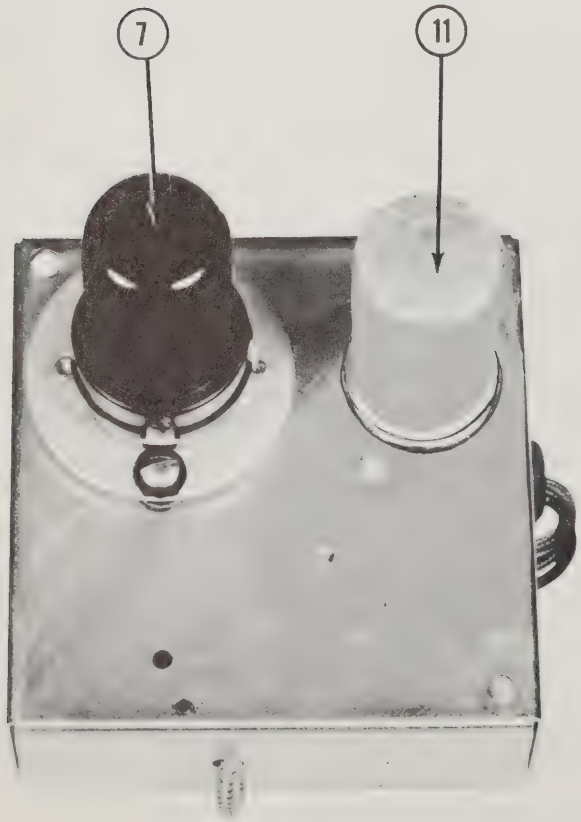
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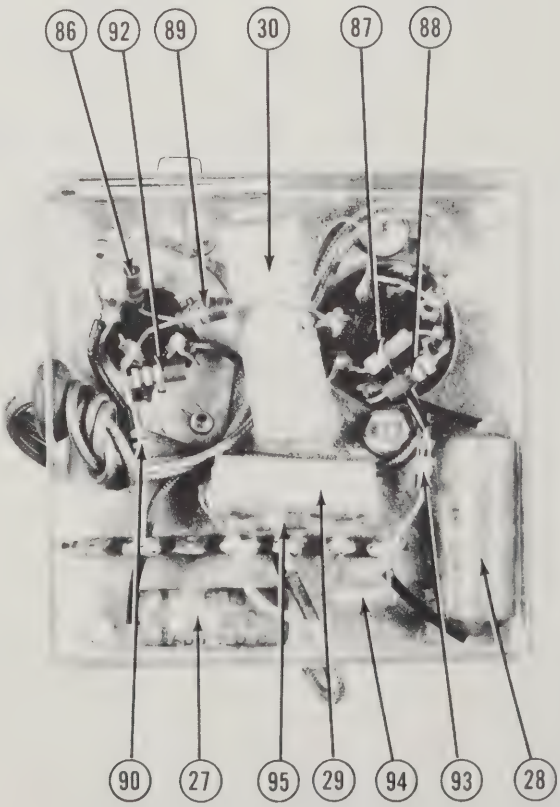
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Mixer	6BA6	6BA6	7BK	
2	Oscillator	6C4	6C4	6B	
3	IF-Amp.	6BA6	6BA6	7BK	
4	IF Amp.-AM Det.-AVC	6SH7	6SH7	6BK	
5	FM Ratio Det.	6AL5	6AL5	6BT	
6	Phono Pre-Amp.	6SC7	6SC7	6S	
7	Audio Amp.	6SC7	6SC7	6S	
8	Power Output	6V6GT	6V6GT	7AC	
9	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GEN. ELECT. PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
10A	30	350		DY-403	EL-424	AF862J4A	UP43145C	● Filter
B	30	350						■ "
C	15	300						▲ "
D	20	25						Cathode bypass
11A	15	250		DY-2x15-250	EL-855	AF44F	UP2215	Filter
B	15	250						"
12	5	25		M-5-150	UT-51	PRS150-	HR102A	Stabilizing Cap.
13	.003	1000		TM-15-003	TM-23	1084-003	MD1663	Output Plate Bypass
14	.02	600		S-6-02	TC-12	684-02	DT6S2	Audio Coupling
15	.01	600		S-6-01	TC-11	684-01	DT6S1	" "
16	.01	600		S-6-01	TC-11	684-01	DT6S1	" "
17	.003	600		S-6-003	TC-25	684-003	DT6D3	" "
18	.007	600		S-6-006	TC-26	684-0075	DT6D6	De-emphasis
19	.007	600		S-6-006	TC-26	684-0075	DT6D6	AVC Filter
20	.01	600		S-6-01	TC-11	684-01	DT6S1	2nd IF Decoupling
21	.01	600		S-6-01	TC-11	684-01	DT6S1	1st IF Plate Decoup.
22	.01	600		S-6-01	TC-11	684-01	DT6S1	AVC Filter
23	.05	400		S-4-05	TC-15	484-05	DT4S5	" "
24	.01	600		S-6-01	TC-11	684-01	DT6S1	Mixer Plate Decoup.
25	.05	600		S-6-05	TC-15	684-05	DT6S5	Screen Bypass
26	.002	600		S-6-002	TC-22	684-002	DT6D2	Tone Comp.
27	.02	600		S-6-02	TC-12	684-02	DT6S2	Audio Coupling
28	.05	600		S-6-05	TC-15	684-05	DT6S5	" "
29	.01	600		S-6-01	TC-11	684-01	DT6S1	Tone Compensation
30	.05	600		S-6-05	TC-15	684-05	DT6S5	Audio Coupling
31	.05	200		S-4-05	TC-15	484-05	DT4S5	Feedback
32	47			MO.5-45	1FM-45	1468-00005	5W5Q5	AF Plate Bypass
33	330			MO.5-33	1FM-33	1468-0003	5W5T3	Diode Load Cap.
34	330			MO.5-33	1FM-33	1468-0003	5W5T3	" " "
35	100			MO.5-31	1FM-31	1468-0001	5W5T1	Diode RF Filter
36	100			MO.5-31	1FM-31	1468-0001	5W5T1	Diode RF Filter
37	2200			MW.5-22	1FM-22	1467-002	1W5D2	Mixer Cathode Bypass
38	100			MO.5-31	1FM-31	1468-0001	5W5T1	RF Coupling - Cer.
39	10			MO.5-41	1FM-41	1468-00001	5W5Q1	" "
40	15							" " - Cer.
41	6.8							Osc. Coupling - Cer.
42	1.5							" " - "
43	150			MO.5-31	1FM-31	1468-00015	5.5T15	Fixed Padder
44	3.3							RF Coupling - Cer.
45	470			MO.5-35	1FM-35	1468-0005	5W5T5	Osc. Plate Bypass
46	47			MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.-Cer.
47	56							Fixed Trimmer-Cer.
48	10			MO.5-41	1FM-41	1468-00001	5W5Q1	" " - "
49	100			MO.5-31	1FM-31	1468-0001	5W5T1	FM Ant. Coupling
50	10			MO.5-41	1FM-41	1468-00001	5W5Q1	RF Bypass Pwr. Supply-Cer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GEN. ELECT. PART No.	MALLORY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
51	2 Meg.	2					Volume Control & SW.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GEN. ELECT. PART No.	IRC PART No.	IDENTIFICATION CODES
52	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Antenna Loading
53	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Mixer Grid
54	1000Ω	½		BTS-1000	Br.-Blk.-Red Mixer Cathode
55	2200Ω	½		BTS-2200	Red-Red-Red Mixer Plate Decoupling
56	15KΩ	2		BT-2-15K	Br.-Grn.-Or. Bleeder
57	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Oscillator Grid
58	220Ω	½		BW-½-220	Red-Red-Br. Oscillator Plate Decoupling
59	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
60	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AVC Network
61	47Ω	½		BW-½-47	Yl.-Vi.-Blk. 1st IF Cathode
62	2200Ω	½		BTS-2200	Red-Red-Red 1st IF Plate Decoupling
63	5600Ω	2		BT-2-5600	Grn.-Blue-Red Screen Dropping
64	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Coupling
65	220KΩ	½		BTS-220K	Red-Red-Yl. 2nd IF Grid
66	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode RF Filter
67	5600Ω	2		BT-2-5600	Grn.-Blue-Red 2nd IF Decoupling
68	22Ω	½		BW-½-22	Red-Red-Blk. Balancing Resistor-See Note 1
69	47KΩ	½		BTS-47K	Yl.-Vi.-Or. De-emphasis
70	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
71	560Ω	½		BTS-560	Grn.-Blue-Br. Balancing Resistor
72	680Ω	½		BTS-680	Blue-Gray-Br. " "
73	13KΩ	½		BTS-12K	Br.-Or.-Or. Ratio Detector Diode Load
74	1500Ω	½		BTS-1500	Br.-Grn.-Red Series Volume Control
75	6.8 Meg.	½		BTS-6.8 Meg.	Blue-Gray-Grn. FM Pre-Amp. Grid
76	47KΩ	½		BTS-47K	Yl.-Vi.-Or. FM Pre-Amp. Plate Load
77	6.8 Meg.	½		BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
78	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
79	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
80	330Ω	1		BW-1-330	Or.-Or.-Br. Output Cathode
81	15KΩ	½		BTS-15K	Br.-Grn.-Or. Feedback
82	100KΩ	½		BTS-100K	Br.-Blk.-Yl. "
83	150Ω	10		AB-1500	Filter
84	1200Ω	2		BT-2-1200	Br.-Red-Red "
85	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Tone Compensation
86	6800Ω	½		BTS-6800	Blue-Gray-Red Phono Shunt
87	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. 1st Phono Amp. Grid
88	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. 2nd Phono Amp. Grid
89	68KΩ	½		BTS-68K	Blue-Gray-Or. 1st Phono Amp. Plate Load
90	33KΩ	½		BTS-33K	Or.-Or.-Or. 2nd Phono Amp. Plate Load
91	68KΩ	½		BTS-68K	Blue-Gray-Or. 1st Phono Amp. Plate Decoupling-Note 2
92	33KΩ	½		BTS-33K	Or.-Or.-Or. 2nd Phono Amp. Plate Decoupling
93	220KΩ	½		BTS-220K	Red-Blk.-Yl. Tone Compensation
94	27KΩ	½		BTS-27K	Red-Vi.-Or. Tone Compensation
95	180KΩ	½		BTS-180K	Br.-Gray-Yl. Tone Compensation
96	1000Ω	½		BTS-1000	Br.-Blk.-Red Parasitic Suppressor

Note 1 - Some models have this resistor inside Item #111.
Note 2 - Not used in all models.

TRANSFORMER (POWER)

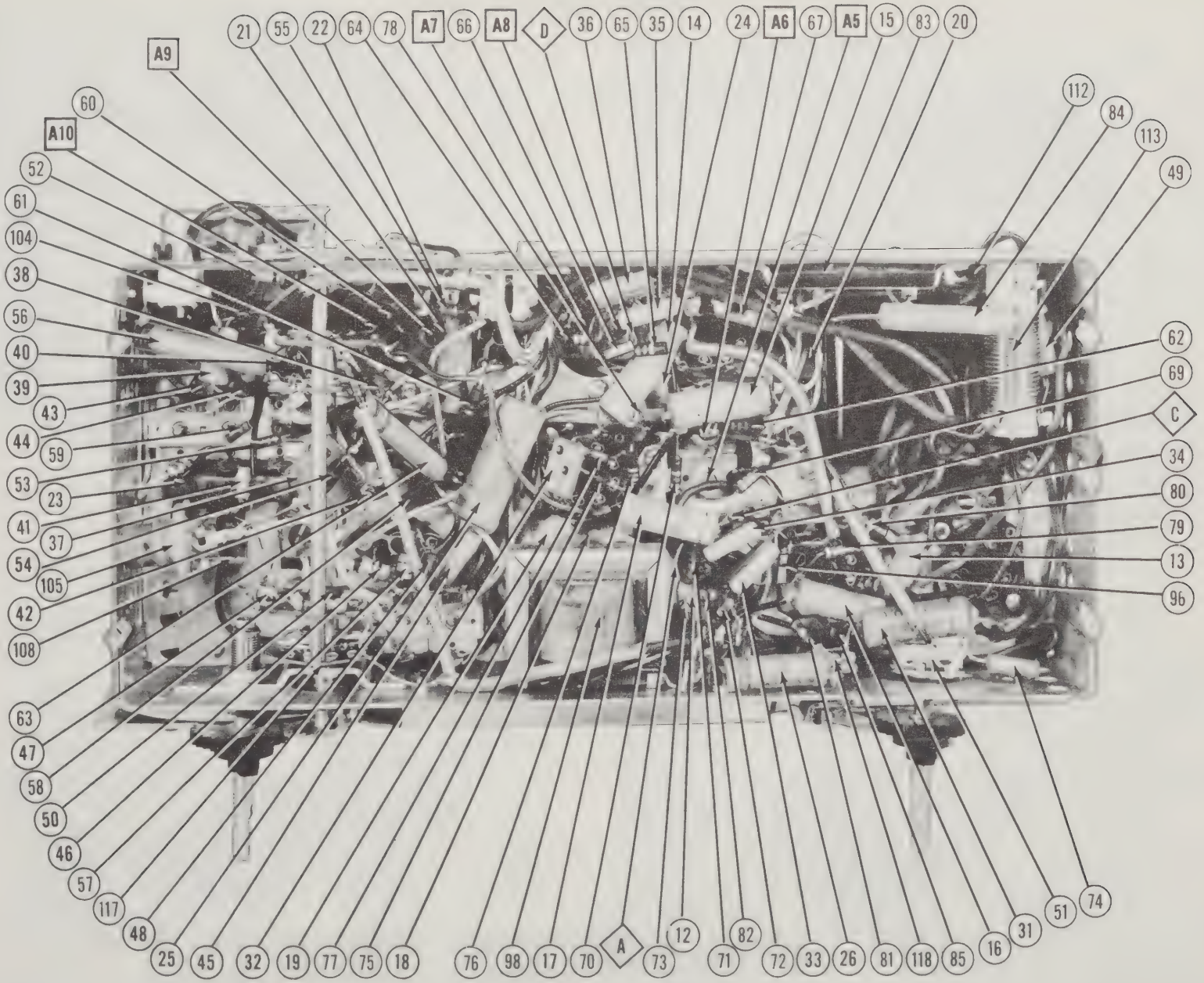
ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: GEN. ELECT. PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
97	117V AC @ .6A	540V CT @ .08A	5.0V AC @ 2.0A	6.3V AC @ 2.7A SEC. 4 2.6V CT @ .6A			T22R32*	

*Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: GEN. ELECT. PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
98	5700Ω	8.5Ω	80Ω	.5Ω		A-3828	T22S 7	A-2410	

DATE 2/48 SSP # 2?? FILED #1-???


21
55
22
64
78
A7
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A8
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A9
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A
73
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71
82
72
33
26
81
118
85
16
31
51
74
112
84
113
49
62
69
C
34
80
79
13
96

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-1011		†Replace output transformer to
99	FM	3.5Ω		Mod. P1--T		match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
100	11-7/8"	1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA: MEISSNER PART No.	
101	Loop Ant.		.1Ω			Items 102, 103, 106 and 107 are part of tuner.
102	Ant. Coil	.5Ω	5.4Ω			
103	FM RF Coil		0Ω			
104	Wave Trap		.1Ω			
105	BC Osc.Coil		8.6Ω			
106	BC Osc. Shunt Coil		2.5Ω			
107	FM Osc.Coil		0Ω			
108	FM Osc.Cath. Choke		.1Ω			
109A	Input IF AM	10.5Ω§	13.1Ω			§Includes both primaries.
B	" " FM		.4Ω			
110A	Output IF AM	12.8Ω‡	1..1Ω‡			‡Includes AM and FM primaries and secondaries
B	" " FM					
111	Disc. Trans.	1.2Ω	.4Ω			
112	FM Ant. Choke		.1Ω			
113	FM Line Choke		0Ω			

DIAL LIGHT

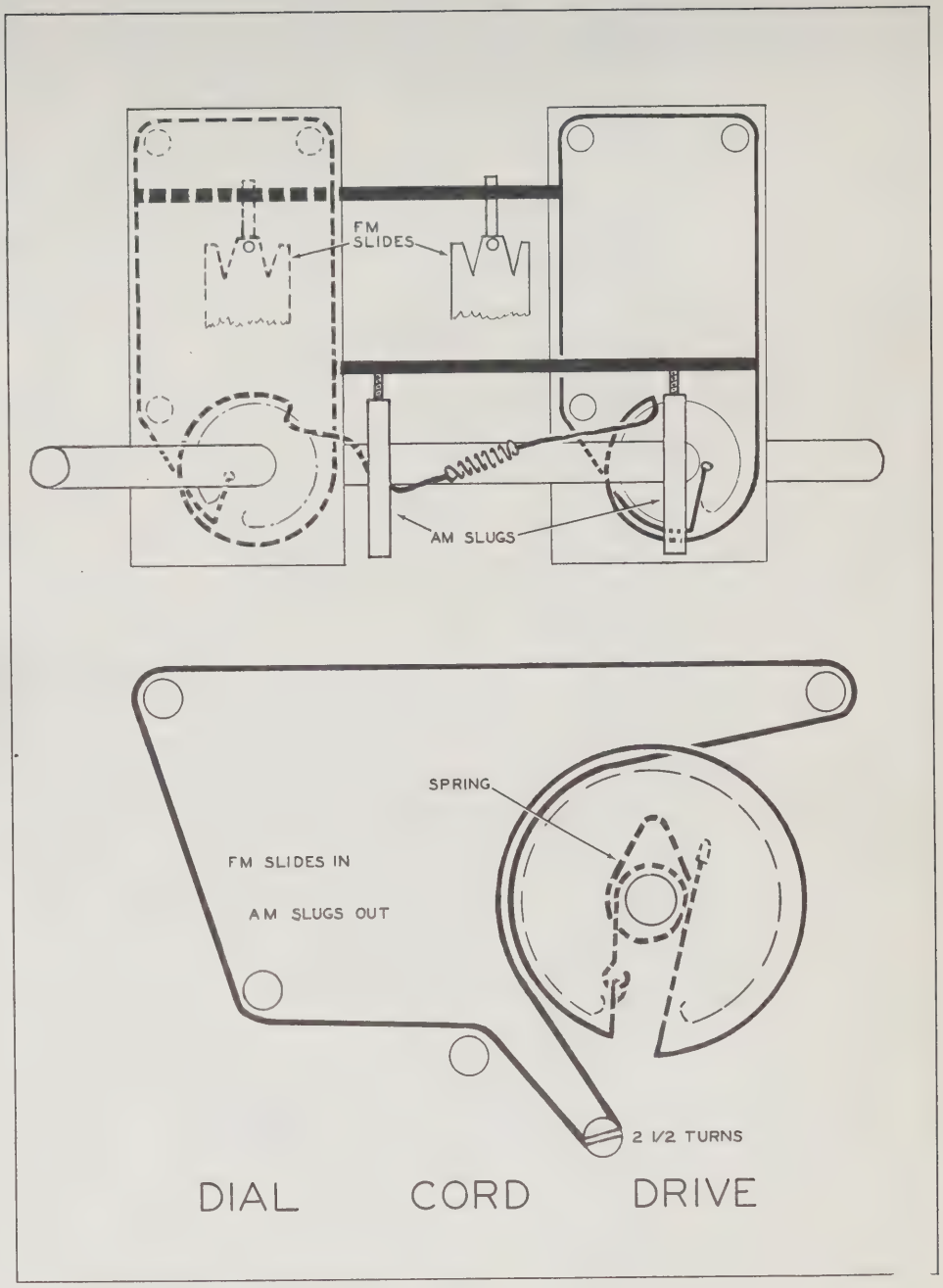
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA	INSTALLATION NOTES
114-116	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	GEN. ELECT. PART No.	NOTES
117	Switch		Band
118	"		Tone

DISASSEMBLY INSTRUCTIONS

1. Remove two push-on type control knobs.
2. Remove fourteen Phillips head screws holding loop to back of cabinet. Remove leads from loop antenna. Remove loop antenna from cabinet.
3. Disconnect phono-motor plug.
4. Remove pilot light from front of cabinet.
5. Remove plugs from speaker.
6. Remove phono amp. power plugs from tuning chassis.
7. Remove phono amp. output plug from tuning chassis.
8. Remove phono-pickup plug from phono amp. chassis.
9. Remove two hex nuts holding phono amp. chassis in cabinet. Remove chassis from cabinet.
10. Remove five Phillips head screws holding tuning chassis in cabinet. Remove chassis from cabinet.
11. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



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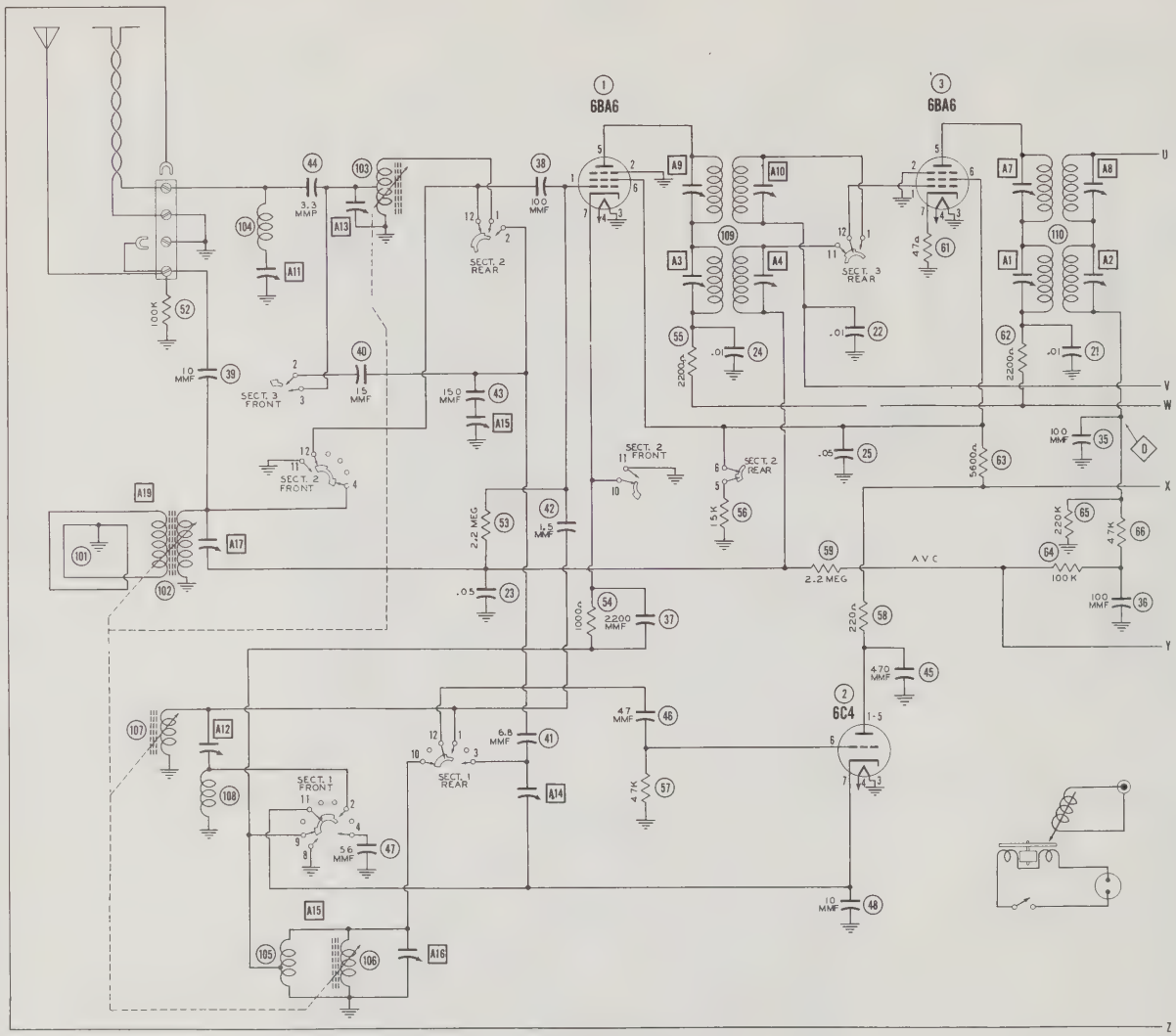

IF=455KC AM

IF=10.7MC FM

STAGE GAIN MEASUREMENTS

CONVERTER GAIN	200X	IN / OUT
1st IF TRANS.	1. X	
IF TUBE	1 X	
2nd IF TRANS.	.9X	
DET.	X	
AM AUDIO	X	
PHONO 1st AUDIO	X	
PHONO 2nd AUDIO	.7X	
OUTPUT	X	

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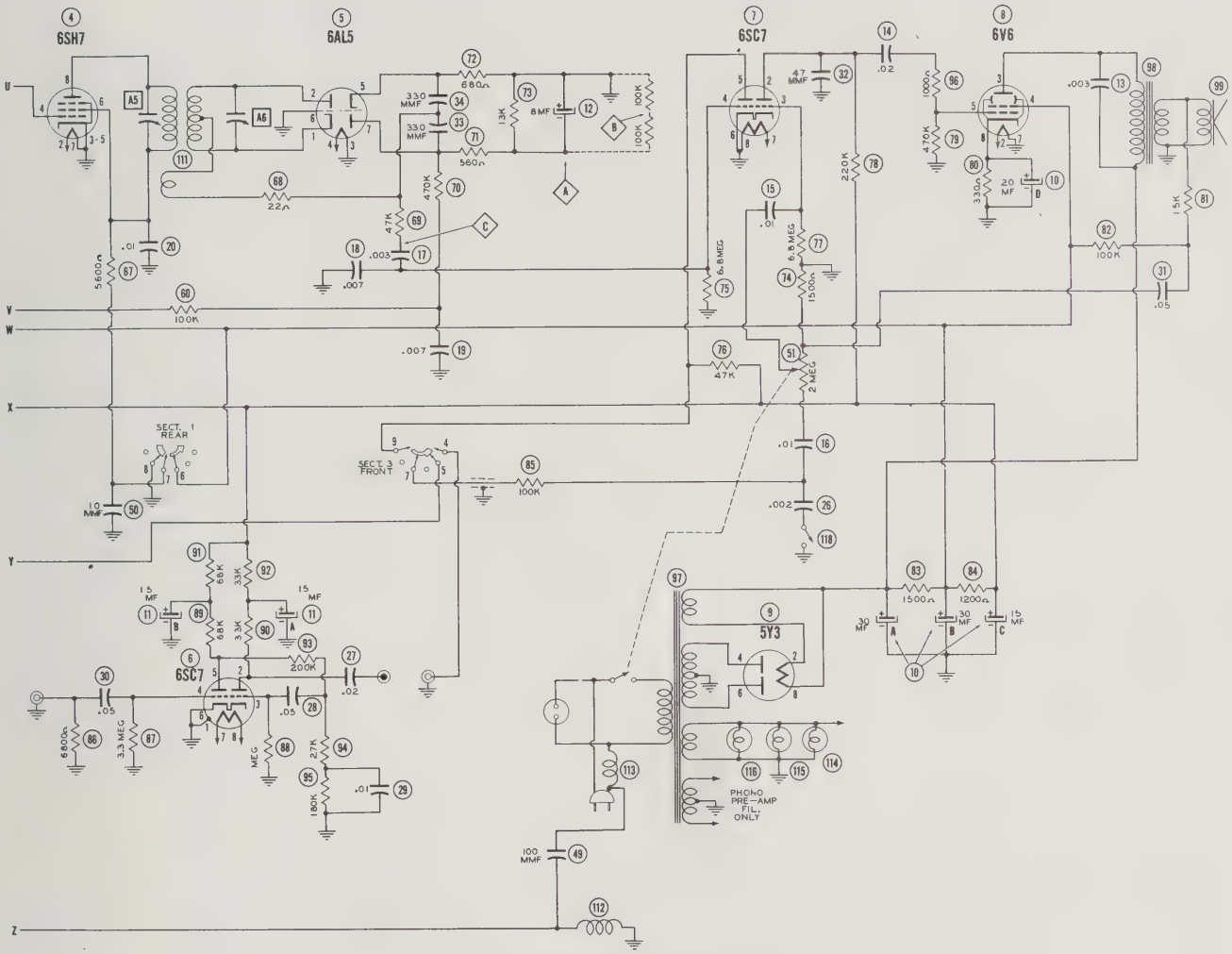
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	0V.	0V.	0V.	6.3VAC	205VDC	110VDC	3.2VDC	-
2	6C4	175VDC	0V.	0V.	6.3VAC	175VDC	-11.5VDC	0V.	-
3	6BA6	-.1VDC	0V.	0V.	6.3VAC	190VDC	110VDC	.6VDC	-
4A	6SH7	0V.	6.3VAC	0V.	-.75VDC	0V.	-.1VDC	0V.	-.1VDC
‡ 4B	6SH7	0V.	6.3VAC	0V.	-.6VDC	0V.	115VDC	0V.	115VDC
‡ 5	6AL5	-.1VDC	-.1VDC	0V.	6.3VAC	0V.	0V.	-.3VDC	-
6	6SC7	0V.	72VDC	-.5VDC	-.5VDC	124VDC	0V.	6.3VAC	0V.
** 7	6SC7	0V.	67VDC	-.5VDC	-.5VDC	70VDC	0V.	3.3VAC	3.3VAC
8	6V6GT	0V.	6.3VAC	267VDC	210VDC	0V.	0V.	0V.	10VDC
9	5Y3GT	0V.	280VDC	0V.	270VAC	0V.	270VAC	0V.	280VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	5 Meg.	0Ω	0Ω	.1Ω	18KΩ	12KΩ	950Ω	-
2	6C4	15KΩ	INF.	0Ω	.1Ω	15KΩ	45KΩ	2Ω	-
3	6BA6	2.5 Meg.	0Ω	0Ω	.1Ω	18KΩ	12KΩ	62Ω	-
4A	6SH7	0Ω	.1Ω	0Ω	200KΩ	0Ω	INF.	0Ω	INF.
‡ 4B	6SH7	0Ω	.1Ω	0Ω	200KΩ	0Ω	60KΩ	0Ω	60KΩ
‡ 5	6AL5	INF.	INF.	0Ω	.1Ω	625Ω	INF.	13KΩ	-
6	6SC7	0Ω	235KΩ	7 Meg.	7 Meg.	60KΩ	0Ω	.1Ω	0Ω
** 7	6SC7	0Ω	120KΩ	4 Meg.	4 Meg.	90KΩ	0Ω	.05Ω	.1Ω
8	6V6GT	0Ω	.1Ω	18KΩ	17KΩ	480KΩ	480KΩ	0Ω	[illegible]
9	5Y3GT	INF.	17KΩ	INF.	95Ω	INF.	90Ω	INF.	17KΩ

**TAKEN IN PHONO POSITION.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With receiver out of cabinet turn tuning control completely clockwise and mark position of pointer. This mark is reference mark referred to in steps below. After receiver has been installed in cabinet set pointer to reference dots at extreme right end of dial with tuning control completely clockwise.

AM IF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	455KC	BC (1 position counter-clockwise)	Tuning slugs fully out.	Across voice coil	A1,A2	Adjust for maximum output.
2	.01 MFD	High side to Pin 1 (grid) 6BA6 Mixer Tube (2). Low side to chassis.	"	"	"	"	A3,A4.	" " " "

FM IF ALIGNMENT USING AM SIGNAL GENERATOR, VTVM AND OUTPUT METER

If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator.

In Step 4 connect 2 100KΩ resistors in series from Point A to chassis. (The values of these two resistors must be within 1% of each other). The junction of these two resistors is Point B. (see schematic).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
3	.01 MFD.	High side to Pin 4 (grid) 6SH7. Low side to chassis.	10.7MC (unmodulated)	FM 2 (2 positions counter-clockwise)	Tuning slugs fully out.	DC probe to Point A. Common to chassis	A5	Adjust for maximum deflection.
4	.01 MFD	"	10.7MC (400∿ modulated)	"	"	DC probe to Point C. Common to Point B.	A6	Adjust for zero deflection and minimum audio output. These should occur simultaneously. If not repeat Steps 3 & 4. Remove two 100KΩ resistors.
5	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (unmodulated)	"	"	DC probe to Point A. Common to chassis	A7,A8	Adjust for maximum deflection.
6	.01 MFD	High side to Pin 1 (grid) of 6BA6 Mixer Tube (1). Low side to chassis.	"	"	"	"	A9,A10	"
7	.01 MFD	"	"	"	"	"	A5,A7, A8,A9 A10	"
8	Direct	Across FM dipole terminals.	"	"	"	"	A11	Adjust for minimum deflection. Continue with FM RF Alignment.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60∿ modulation & 450KC sweep with exception of Step 6 when 225KC sweep is used. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
3	.01 MFD	High side to Pin 1 (grid) 6BA6 Mixer Tube(1). Low side to chassis.	10.7MC (freq. modulated)	FM 2 (2 positions counter-clockwise)	Tuning slugs fully out.	Vertical input to Point D. Ground to chassis.	A7,A8	Adjust for maximum amplitude, symmetry & coincidence of pattern per Figure 1.
4	.01 MFD	"	"	"	"	"	A9,A10	"
5	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (freq. modulated 225KC sweep)	"	"	Vertical input to Point D. Ground to chassis.	A7,A8	Adjust A7 for maximum amplitude and A8 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2.
6	DIRECT	Across FM dipole terminals.	10.7MC (freq. modulated)	"	Tuning slugs fully in.	Vertical input to Point D. Ground to chassis.	A11	Adjust for minimum amplitude of pattern per Fig. 1 with FM RF alignment Step 9.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	Direct	Across dipole terminals.	98MC (unmodulated)	FM 2	2-5/8" from reference mark.	DC probe to Point A. Low side to chassis.	A12	Adjust for maximum deflection.
10	Direct	"	"	"	Tune for maximum deflection.	"	A13	Rock tuning control and adjust for maximum deflection.
11	Direct	"	46MC (unmodulated)	FM 1 (fully counter clockwise)	2-17/32" from reference mark.	"	A14	Adjust for maximum deflection.
12	Direct	"	"	"	Tune for maximum deflection.	"	A15	Rock tuning control and adjust for maximum deflection.

AM RF ALIGNMENT

Volume control should be at maximum output, signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
13	Direct	High side to AM terminal (green lead disconnected with loop connected). Low side to chassis.	1620KC (400∿ modulated)	BC	Tuning slugs fully out	Across voice coil	A16, A17.	Adjust for maximum output.
14	Direct	"	1000KC (400∿ modulated)	"	2-5/32" from reference mark.	"	A18, A19	Adjust for maximum output. Repeat Steps 13 & 14 until no further improvement can be made.

FIG. 1

FIG. 2

HALLICRAFTERS MODEL S-40A

TRADE NAME	Hallicrafters, Model S-40A
MANUFACTURER	Hallicrafters Co., 2611 S. Indiana Ave., Chicago, Ill.
TYPE SET	AC Operated 4 Band Superheterodyne Commercial Type Receiver
TUBES (NINE)	Types, 6SG7 RF Amp., 6SA7 Converter, 6SK7 1st IF Amp., 6SK7 2nd IF Amp., 6SQ7 Det.-AVC-AF, 6H6 Gas Gate-Noise Limiter, 6J5GT BFO, 6F6G Power Output, 80 Rectifier.
POWER SUPPLY	110-120 Volts AC or 6.3 Volts "A" Supply and 260 Volts "B" Supply
RATING	.62 Amp. @ 117 Volts AC or 5 Amp. @ 6.3 Volts and 70MA @ 260 Volts DC
TUNING RANGE-BROADCAST	540-1700KC SHORT WAVE 1.7-5.35KC, 5.35-15.7MC, 15.7-43MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn receiver on and allow at least 10 minutes for warm up before attempting alignment.

To set dial turn tuning cap. fully closed, loosen dial set screw and set dial so that last reference line at low frequency end of Band "1" coincides with fixed red pointer line.

Turn sensitivity control to maximum, CW/AM switch to AM (except in Step 2), AVC switch "off", noise limiter "off", tone control to "high", standby/receive to receive and band spread dial to zero (fully clockwise).

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

Use 400~ modulation signal in all Steps except #2.

RMA dummy consists of 200MMFD cap. in series with 20 microhenry choke with choke shunted with 400MMFD cap in series with 400Ω carbon resistor.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	None	High side to center stator of tuning cap. Low side to chassis.	455KC	Band "1"	1000KC	Across voice coil	A1,A2, A3,A4, A5,A6	Adjust for maximum output in order given and repeat.
2	None	"	455KC (Mod.off)	"	"	"	A7	Turn CW/AM switch to CW. Remove pitch control knob. Adjust A7 for zero beat. Replace pitch control knob.
3	RMA Dummy	High side to terminal "A1" of ant. term. strip. Low side to chassis.	36MC (Mod. on)	Band "4"	36MC	"	A8	Turn CW/AM switch to AM. Adjust A8 for maximum output.
4	"	"	18MC	"	18MC	"	A9	Adjust for maximum output. Repeat Steps 3 & 4 until no further improvement can be made.
5	"	"	36MC	"	Tune for maximum output.	"	A10,A11	Rock tuning cap. and adjust for maximum output.
6	"	"	18MC	"	"	"	A12,A13	Rock tuning cap. and adjust for maximum output. Repeat Steps 5 & 6 until no further improvement can be made.
7	"	"	14MC	Band "3"	14MC	"	A14	Adjust for maximum output
8	"	"	10MC	"	10MC	"	A15	Adjust for maximum output. Repeat Steps 7 & 8 until no further improvement can be made.
9	"	"	14MC	"	Tune for maximum output.	"	A16,A17	Rock tuning cap. and adjust for maximum output.
10	"	"	7MC	"	"	"	A18,A19	Rock tuning cap. and adjust for maximum output. Repeat Steps 9 & 10 until no further improvement can be made.
11	"	"	5MC	Band "2"	5MC	"	A20	Adjust for maximum output.
12	"	"	3MC	"	3MC	"	A21	Adjust for maximum output. Repeat Steps 11 & 12 until no further improvement can be made.
13	"	"	5MC	"	Tune for maximum output.	"	A22, A23	Adjust for maximum output.
14	"	"	1500KC	Band "1"	1500KC	"	A24	" " " "
15	"	"	600KC	"	600KC	"	A25	Adjust for maximum output. Repeat Steps 14 & 15 until no further improvement can be made.
16	"	"	1500KC	"	Tune for maximum output.	"	A26, A27	Adjust for maximum output.

HALLICRAFTERS MODEL S-40A

HALLICRAFTERS MODEL S-40A

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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DATE 2/48 SET #33 FOLDER #483-10

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		HALLICRAFTERS PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6SG7	6SG7	8BK	
2	Converter	6SA7	6SA7	8R	
3	1st IF Amp.	6SK7	6SK7	8N	
4	2nd IF Amp.	6SK7	6SK7	8N	
5	Det.-AVC-AF	6SQ7	6SQ7	8Q	
6	Gas Gate-Noise Limiter	6H6	6H6	7Q	
7	BFO	6J5GT	6J5GT	6Q	
8	Power Output	6F6G	6F6G	7S	
9	Rectifier	80	80	4C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

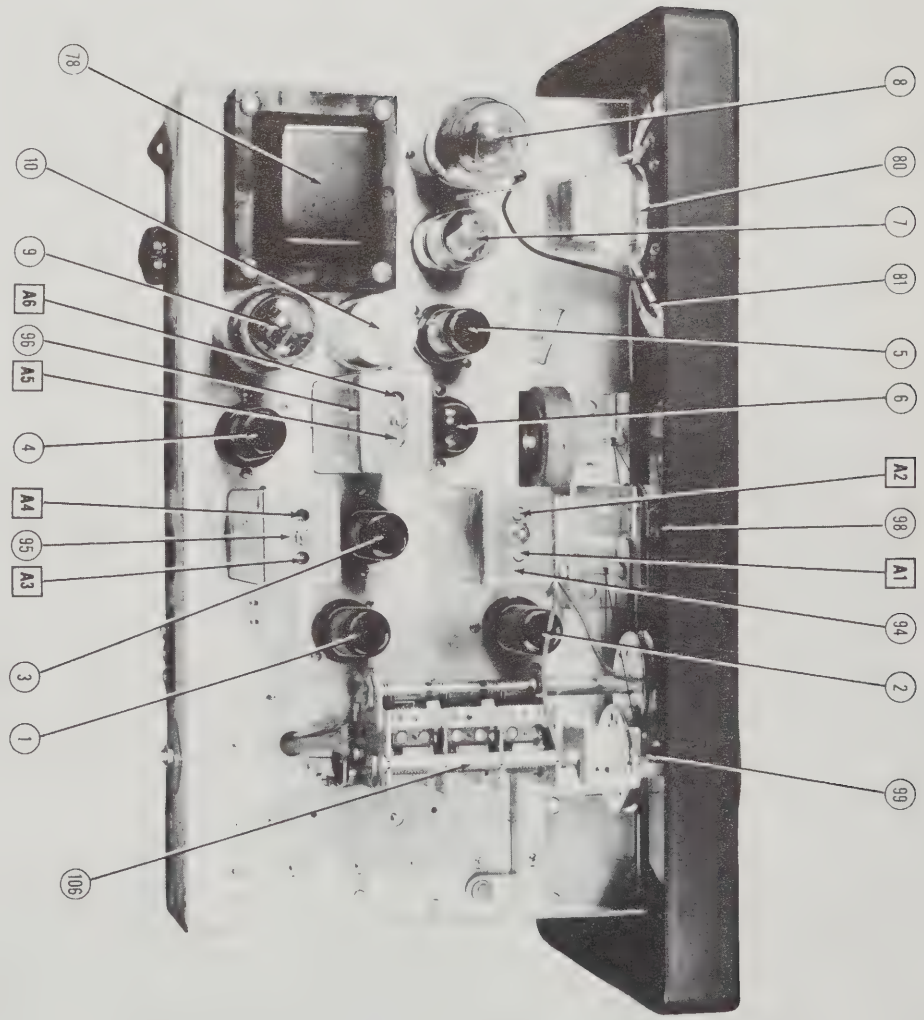
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	HALLICRAFT. PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
10A	30	450	45A062	DY-403	EL-344		UP43145C	◆ Filter
B	10	450			UT-8			■ "
C	10	450						▲ "
11	30	25		M-25-25	TA-25	PRS25-25	BR252A	Cathode Bypass
12	01	600	46AW103J	MPH-6-01	TC-11	684-01	DT6S1	Line Filter
13	002	1000	46A104	TM-16-002	TR-22	1084-002	MD16D2	Output Plate Bypass
14	02	600	46AY203J	S-6-02	TC-12	684-02	DT6S2	Tone Comp.
15	.1	600	46AV104J	S-6-1	TC-1	684-.1	DT6P1	RF Bypass Power Supply
16	02	600	46AY203J	S-6-02	TC-12	684-02	DT6S2	Audio Coupling
17	02	600	46AY203J	S-6-02	TC-12	684-02	DT6S2	" " "
18	05	200	46A091	S-4-05	TC-15	484-05	DT4S5	Noise Lim. Plate Bypass
19	02	600	46AY203J	S-6-02	TC-12	684-02	DT6S2	2nd IF Plate Decoupling
20	05	400	46AW503J	S-4-05	TC-15	484-05	DT4S5	RF Bypass Power Supply
21	05	200	46A091	S-4-05	TC-15	484-05	DT4S5	2nd IF Cathode Bypass
22	05	200	46A091	S-4-05	TC-15	484-05	DT4S5	1st IF Cathode Bypass
23	02	200	46AU203J	S-4-02	TC-12	484-02	DT4S2	AVC Filter
24	05	400	46AW503J	S-4-05	TC-15	484-05	DT4S5	RF Bypass Power Supply
25	05	400	46AW503J	S-4-05	TC-15	484-05	DT4S5	RF Screen Bypass
26	05	200	46A091	S-4-05	TC-15	484-05	DT4S5	RF Cathode Bypass
27	05	200	46A091	S-4-05	TC-15	484-05	DT4S5	AVC Filter
28	470	500	CM20A471J					BFO Fixed Trimmer
29	47	500	CM20A470M	MO.5-45	1FM-45	1468-00005	5W5Q5	BFO Osc. Grid Cap.
30	8200	500	46AW103J	S-6-01	TC-11	684-01	DT6S1	BFO Plate Bypass
31	270	500	CM20A271K	MO.5-33	1FM-33	1468-0003	5W5T3	AF Plate Bypass
32	1000	500	CM25A102K	MW.5-23	1FM-21	1468-001	1W5D1	Audio Coupling
33	47	500	CM20A470M	MO.5-45	1FM-45	1468-00005	5W5Q5	Diode RF Filter
34	47	500	CM20A470M	MO.5-45	1FM-45	1468-00005	5W5Q5	" " "
35	8200	500	46AW103J	S-6-01	TC-11	684-01	DT6S1	Osc. Anode Coupling
36	68	500	CC25UK680K					Fixed Trimmer#-Cer.
37	390	500	CM20A391K	MO.5-34	1FM-34	1468-0004	5W5T4	Osc. Grid Cap.
38	3		44A158					Compensating Cap.#
39	3000	500	CM30C302K	MW.5-23	MS-23	1464-003	1R5D3	Fixed Pad
40	1500	500	CM30C152J	MW.5-215		1464-0015	1R5D15	" "
41	27	500	CM20A470M					RF Coupling#-Cer.
42	15	500	CC21UK150M					" " "

#Negative temperature coefficient cap.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	HALLICRAFT. PART No.	IRC PART No.	CLAROSTAT PART No.	
43A	500KΩ	½	25A534	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 43A per instructions
44	10KΩ	½	25A533			Sensitivity Control & SW.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	HALLICRAFTERS PART No.	IRC PART No.	
45	47KΩ	½	RC20AE473M	BTS-47K	Yl.-Vi.-Or. Diode Load - See Note 3
46	27Ω	½	RC20AE270M	BW-½-27	Red-Vi.-Blk. Parasitic Suppressor-See Note 1
47	100KΩ	½	RC20AE104M	BTS-100K	Br.-Blk.-Yl. AVC Network
48	120Ω	½	RC20AE121K	BW-½-120	Br.-Red-Br. RF Cathode
49	27Ω	½	RC20AE270M	BW-½-27	Red-Vi.-Blk. Parasitic Suppressor-See Note 1
50	1000Ω	½	RC20AE102M	BTS-1000	Br.-Blk.-Red RF Screen Decoupling
51	6800Ω	1	RC31AE682K	BTA-6800	Blue-Gray-Red RF Plate Load
52	27Ω	½	RC20AE470M	BW-½-27	Red-Vi.-Blk. Parasitic Suppressor
53	18KΩ	½	RC20AE183K	BTS-18K	Br.-Gray-Or. Oscillator Grid
54	10KΩ	2	RC41AE103K	BT-2-10K	Br.-Blk.-Or. Converter Screen Dropping
55	10Ω	½	RC20AE100M	BW-½-10	Br.-Blk.-Blk. Parasitic Suppressor
56	300Ω	½		BW-½-270	Or.-Blk.-Br. 1st IF Cathode-See Note 2
57	12KΩ	4	RC65CE123K	AB-12K	Br.-Red-Or. Voltage Dropping
58	470Ω	½		BTS-470	Yl.-Vi.-Br. 2nd IF Cathode - See Note 2
59	1000Ω	½	RC20AE102M	BTS-1000	Br.-Blk.-Red Decoupling
60	1500Ω	10	24B0152E	AB-1500	Filter
61	2.2 Meg.	½	RC20AE225M	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
62	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Br.-Blk.-Grn. Noise Limiter Coupling
63	47KΩ	½	RC20AE473M	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
64	100KΩ	½	RC20AE104M	BTS-100K	Br.-Blk.-Yl. Noise Limiter Network
65	270KΩ	½	RC20AE274M	BTS-270K	Red-Vi.-Yl. Diode Load
66	270KΩ	½	RC20AE274M	BTS-270K	Red-Vi.-Yl. " "
67	15 Meg.	½	RC10AE156M	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
68	270KΩ	½	RC20AE274M	BTS-270K	Red-Vi.-Yl. AF Plate Load
69	150Ω	½	RC20AE151M	BW-½-150	Br.-Grn.-Br. AVC Shunt
70	10KΩ	4	RC65CE103K	AB-10K	Br.-Blk.-Or. Decoupling
71	12KΩ	2	RC41AE123K	BT-2-12K	Br.-Red-Or. Bleeder
72	15KΩ	3	RC41AE153M	BT-2-15K	Br.-Grn.-Or. BFO Plate Dropping
73	47KΩ	½	RC20AE473M	BTS-47K	Yl.-Vi.-Or. BFO Grid
74	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. Output Grid
75	680Ω	1	RC31AE681K	BTA-680	Blue-Gray-Br. Output Cathode
76	10KΩ	½	RC20AE103M	BTS-10K	Br.-Blk.-Or. Output Screen Dropping
77	15KΩ	1	RC31AE153M	BTA-15K	Br.-Grn.-Or. Tone Compensation

Note 1 - Some models use 22Ω in this application. IRC replacement BW-½-22.
Note 2 - Some models use 1000Ω in this application. IRC replacement BTS-1000.
Note 3 - Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	HALLICRAFTERS PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
78A	117V AC @ .62A	660V CT @ .067A	5.0V AC @ 2.0A	6.4V AC @ 3.5A	52C140	P-6013	T22R05	P-2953
B					52C139‡			

‡Alternate transformer for universal operation.

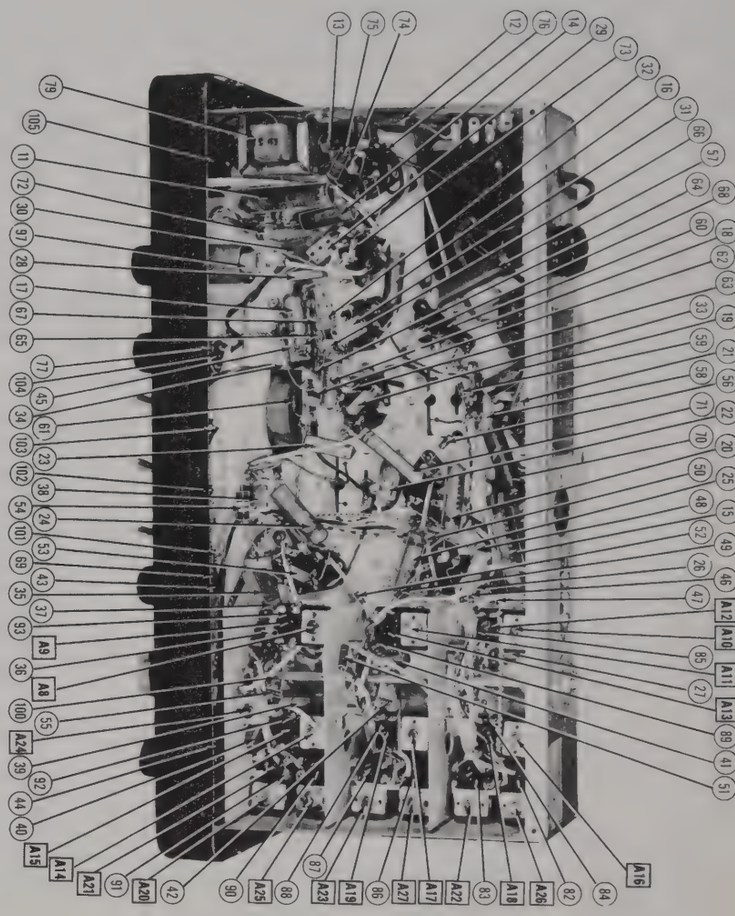
TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		HALLICRAFT. PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
79	4700Ω	3.0Ω	380Ω	.4Ω	55B093	A-3877	T22S45	A-2930	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	VC IMP.	HALLICRAFTER PART No.	JENSEN PART No.		
80	PM	3.0Ω	85B050	ST-107 Mod. P5-V		
	CONE DIA.	VC DIA.				
81	4-3/4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

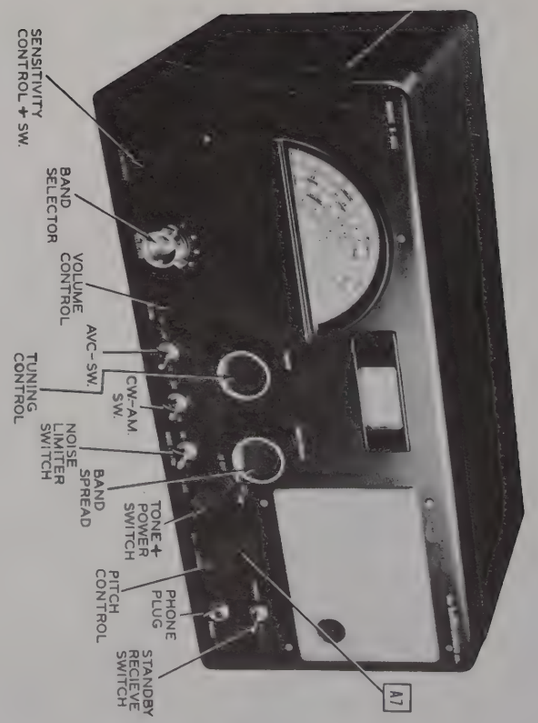
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	HALLICRAFTERS PART No.	MEISSNER PART No.	
	Band					
82	Ant.Coil 1	25Ω	5Ω	51B780		
83	" " 2	.5Ω	1.5Ω	51B781		
84	" " 3	.1Ω	0Ω	51B782		
85	" " 4	.1Ω	0Ω	51B783		
86	RF Coil 1	.1Ω	5Ω	51B784		
87	" " 2		.8Ω	51B785		
88	" " 3	7.5Ω	0Ω	51B786		
89	" " 4	1.2Ω	0Ω	51B787		
90	Osc.Coil 1		3.1Ω	51B912		Tapped at .5Ω
91	" " 2		1.3Ω	51B789		" " .1Ω
92	" " 3		0Ω	51B790		
93	" " 4	0Ω	0Ω	51B791		
94	Input IF	20Ω	4Ω	50C185		
95	Inter. IF	21Ω	4.2Ω	50C186		
96	Output IF	18Ω	1Ω	50C192		
97	BFO Coil		3.5Ω	54B033-2		

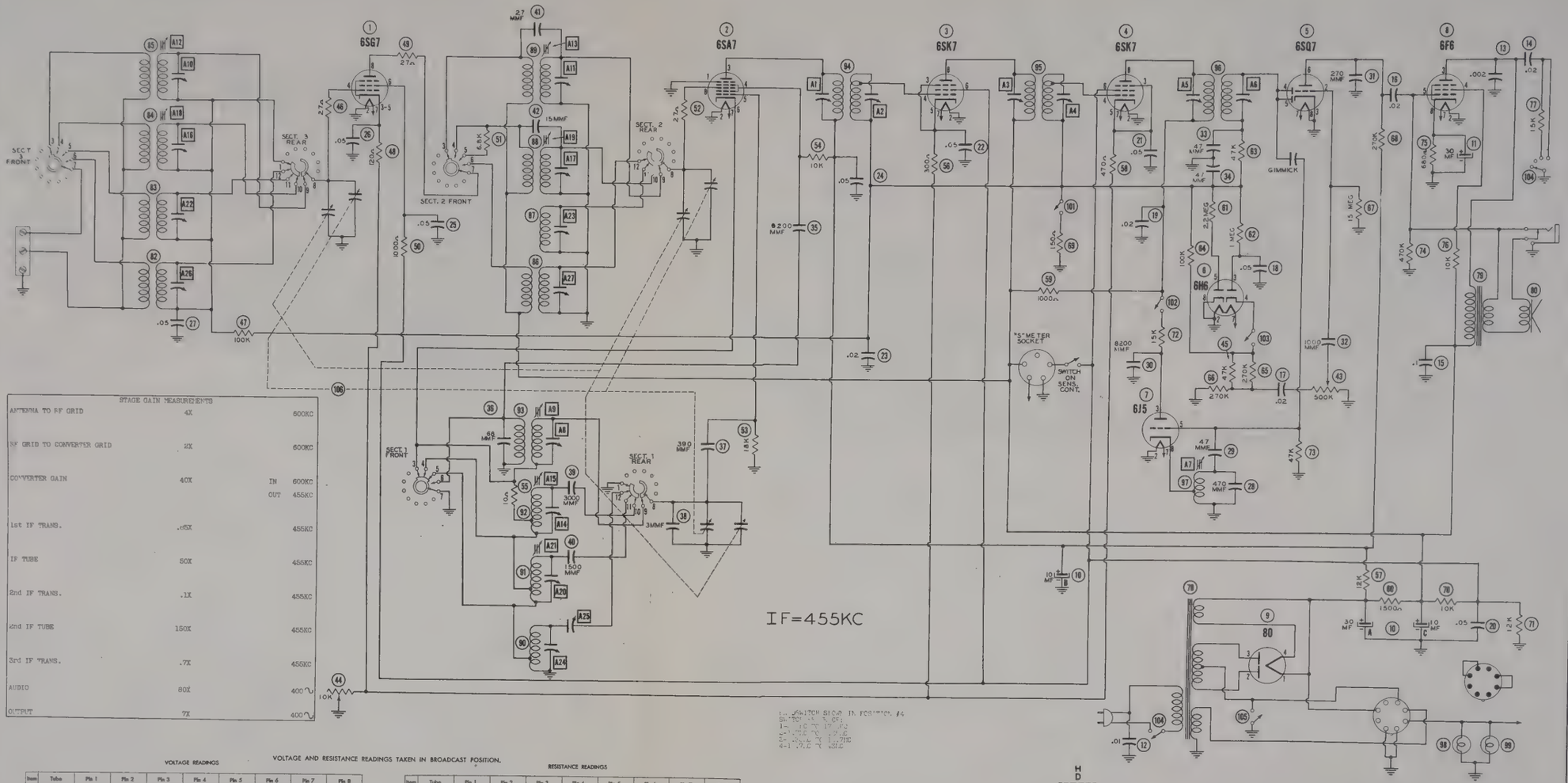
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					HALLICRAFTERS PART No.		
98	Bayonet	6-8	0.25	Blue	39A003		Type 44
99	"	"	"	"	39A003		" "

MISCELLANEOUS

ITEM No.	PART NAME	HALLICRAFTERS PART No.	NOTES
100	Bandswitch	62B039	Ant.-RF Section
		62B044	Osc. Section
		74C172	Shaft & Index Assby.
101	Switch	60A138	AVC
102	"	60A138	CW-AM
103	"	60A138	Noise Limiter
104	"	60A225	On-Off-Tone
105	"	60A138	Standby-Receive
106	3 Gang Var. Cap.	48C138	(15-418MMF) each section
	Trimmer	44A149	A10,A16,A11,A17,A8
	"	44A147	A22,A26,A23,A27,A14,A20,A24





STAGE GAIN MEASUREMENTS			
ANTENNA TO RF GRID	4X		600KC
RF GRID TO CONVERTER GRID	2X		600KC
CONVERTER GAIN	40X	IN	600KC
		OUT	455KC
1st IF TRANS.	.65X		455KC
IF TUBE	80X		455KC
2nd IF TRANS.	.1X		455KC
2nd IF TUBE	150X		455KC
3rd IF TRANS.	.7X		455KC
AUDIO	80X		400~
OUTPUT	7X		400~

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

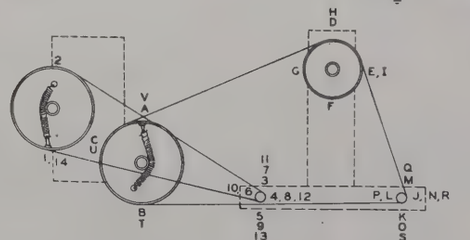
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SG7	0V.	0V.	1VDC	-.3VDC	1VDC	102VDC	6.4VAC	245VDC
2	6SA7	0V.	.2V.	1.6VDC	-7.5VDC	.1VDC	6.4VAC	0V.	
3	6SK7	0V.	0V.	3.35VDC	-.4V.C	2.3EV.C	105VDC	6.4VAC	242VDC
4	6SK7	0V.	0V.	3.9VDC	-.4VDC	3.9VDC	105VDC	6.4VAC	230VDC
5	6SQ7	0V.	-.3VDC	0V.	-.45VDC	-.45VDC	87VDC	6.4VAC	0V.
6	6H6	0V.	0V.	0V.	-.4VDC	-.4V.C	-.9VDC	6.4VAC	0V.
7	6J5	0V.	0V.	140VDC	140VAC	-.9VDC	0V.	6.4VAC	0V.
8	6F6	0V.	0V.	235VDC	235VAC	0V.	225VDC	6.4VAC	16VDC
9	80	320VAC	330VAC	330VAC	320VAC	-	-	-	-

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SG7	0Ω	0Ω	140Ω	3 Meg.	140Ω	13KΩ	.1Ω	20KΩ
2	6SA7	0Ω	0Ω	32KΩ	42KΩ	18KΩ	1.1Ω	.1Ω	33Ω
3	6SK7	0Ω	0Ω	330Ω	3 Meg.	33KΩ	1.1K	.1Ω	20KΩ
4	6SK7	0Ω	0Ω	470Ω	3 Meg.	470Ω	12KΩ	.1Ω	20KΩ
5	6SQ7	0Ω	15 Meg.	0Ω	470KΩ	470KΩ	300KΩ	.1Ω	0Ω
6	6H6	0Ω	0Ω	1.6 Meg.	3.6MΩ	3 Meg.	47MΩ	.1Ω	0Ω
7	6J5	0Ω	0Ω	35KΩ	38KΩ	45KΩ	4.0KΩ	.1Ω	3Ω
8	6F6	0Ω	0Ω	20KΩ	30KΩ	470KΩ	40KΩ	.1Ω	65KΩ
9	80	20KΩ	16KΩ	17KΩ	20KΩ	-	-	-	-

ŞTAKEN WITH VACUUM TUBE VOLTMETER.
RF GAIN FULL ON
BFO SWITCH ON
NOISE LIMITER SWITCH ON
AVC SWITCH ON
STANDBY RECEIVE SWITCH IN RECEIVE POSITION

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS



Dial cable stringing procedure main tuning is indicated by numbers and bandspread tuning is indicated by letters

HOW TO RESTRING DIAL CORDS

Removal of the front panel will be necessary in order to facilitate the restringing of the dial cords. A No. 6 Allen wrench will be required to loosen the set screws in the knobs. The Allen wrench can be obtained from most hardware stores. Use a No. X6337 knurled Spintite wrench to remove knurled ring nuts on the switch bushings.

To restring the main tuning dial cord, cut a 25" length of 18 lb. test dial cord and tie one end to the tension spring of the main tuning capacitor drive pulley at position "1" on the diagram. Following the numbers 1 through 14, wind the cord on the pulley and knob drive shaft. At position "14," stretch the tension spring and tie the cord securely. Cut off the excess cord. Note that three turns are wound on the knob drive shaft.

To restring the bandspread tuning dial cord, cut a 35" length of dial cord and follow the procedure as explained above, except start at position "A" on the diagram and proceed through position "V." Note that the knob drive shaft has three turns and the dial drive pulley has one turn.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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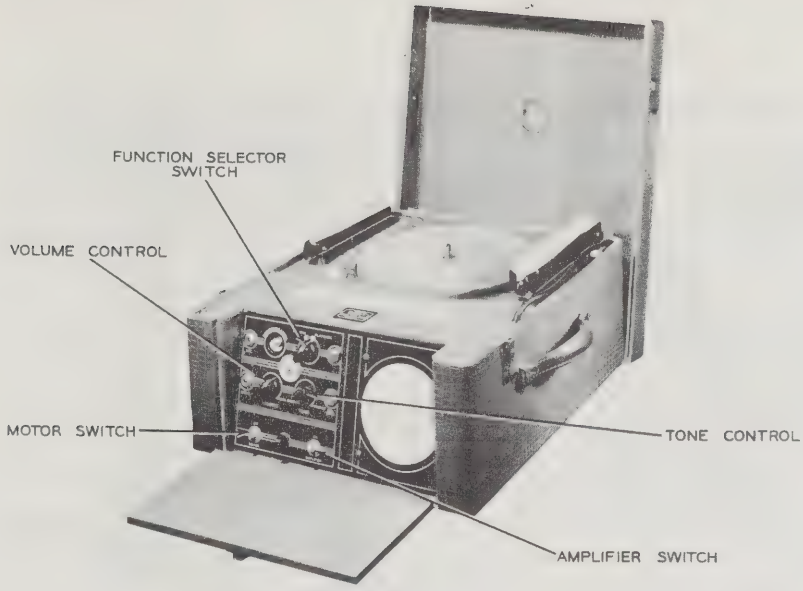
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line. Sensitivity at maximum and noise limiter off.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.



MASCO MODEL RK-5

TRADE NAME	Masco, Model RK-5
MANUFACTURER	Mark Simpson Mfg. Co., Inc., 32-28 49th St., Long Island City 3, N.Y.
TYPE SET	AC Operated 2 Channel Amplifier with built in recorder and playback.
TUBES (FIVE)	Types, 6SL7GT AF Amp., 6SL7GT AF Amp.-Vol. Level Rect., 6U5 Volume Level Indicator, 6V6GT Power Output, 6X5GT Rectifier.
POWER SUPPLY	110-120 Volts AC RATING .38 Amp. @ 117 Volts AC

CUTTING HEAD AND ARM ADJUSTMENTS

There is a possibility that these adjustments may have been altered after leaving the factory, if so, the following information should be sufficient to make the proper readjustments.

With record blank on turntable, cutting stylus in cutting head and cutting arm lowered on the record, the cutting stylus clamp screw should be centered in the slot through which it protrudes. This condition should occur when the underside of the nose of cutter arm is approximately ¼ inch above record surface. If this height of the arm differs appreciable, adjustments may be made by adjusting screw and lock nut. A cut of at least ten turns should now be made on the record blank. Remove record and hold so light is reflected from surface just cut, then relative width of cut can be observed.

When properly adjusted, grooves are just about as wide as space between grooves. For readjustment, turn adjusting screw to right or clockwise to increase depth and width of cut and to left or counter clockwise to decrease the depth or width. Turn screw in quarter or half-turns only as this adjustment is very critical. When cutting head is properly adjusted and arm is raised to approximately 45 degrees, cutting stylus screw should just rest on bottom of slot and cutting head almost floating.

TUBE REPLACEMENT

Tube replacement may necessitate the re-adjustment of the two internal controls. After installation of the new tubes the hum control adjustment may be checked as follows:

1. Turn amplifier switch to ON but do not plug in microphone or radio and do not play record.
2. Turn VOLUME control to maximum.
3. Set TONE to treble.
4. Set RECORD-PLAYBACK switch to PLAYBACK.
5. Adjust hum control for minimum hum as heard in speaker.

The recording level indicator control generally will not require re-adjustment after tube replacement. If after tube replacement it is found that a recording properly made is either badly distorted due to too high a recording level or barely audible due to a very low recording level, the control must be reset. (This control is factory sealed to prevent accidental tampering). Readjustment is as follows:

1. Turn amplifier switch to ON.
2. Set RECORD-PLAYBACK switch to RECORD.
3. Feed a 400 or 1000 cycle signal into RADIO jack.
4. Adjust VOLUME control until a reading of 120 volts is obtained from terminal located on back of panel. Terminal is marked with red for ease of identification. 1000 ohms per volt meter may be used for this test.
5. Adjust Volume level indicator control until signal applied in Step 4 just closes eye.
6. Re-seal control with nail polish, lacquer, etc.,

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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DATE 2/48 SET #33 FOLDER #483-11

PARTS LIST AND DESCRIPTIONS

MASCO MODEL RK-8

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MASCO PART No.	STANDARD REPLACEMENT		
1	AF Amp.		6SL7GT	8BD	
2	AF-Vol. Level Rect.		6SL7GT	8BD	
3	Volume Level Indicator		6U5	6R	
4	Power Output		6V6GT	7AC	
5	Rectifier		6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MASCO PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
6	16	450		M-16-450	UT-161	PRS450-16	BR1645	Filter
7	16	450		M-16-450	UT-161	PRS450-16	BR1645	"
8A	8	450		DH-2x8-450	TA-88	PRSA450-8-8	EZ8845	"
B	8	450						"
9	50	50		M-50-50	TA-550	PRS50-50	BR505	Cathode Bypass
10	.1	600		S-6-1	TC-1	684-.1	DT6P1	Audio Coupling
11	.005	600		S-6-005	TC-25	684-005	DT6D5	Tuning Eye Coupling
12	.01	600		S-6-01	TC-11	684-01	DT6S1	Audio Coupling
13	.01	600		S-6-01	TC-11	684-01	DT6S1	Tone Compensation
14	.01	600		S-6-01	TC-11	684-01	DT6S1	Audio Coupling
15	.01	600		S-6-01	TC-11	684-01	DT6S1	" "
53	500			MO.5-35	1FM-35	1468-0005	5W5T5	Diode Filter

CONTROLS

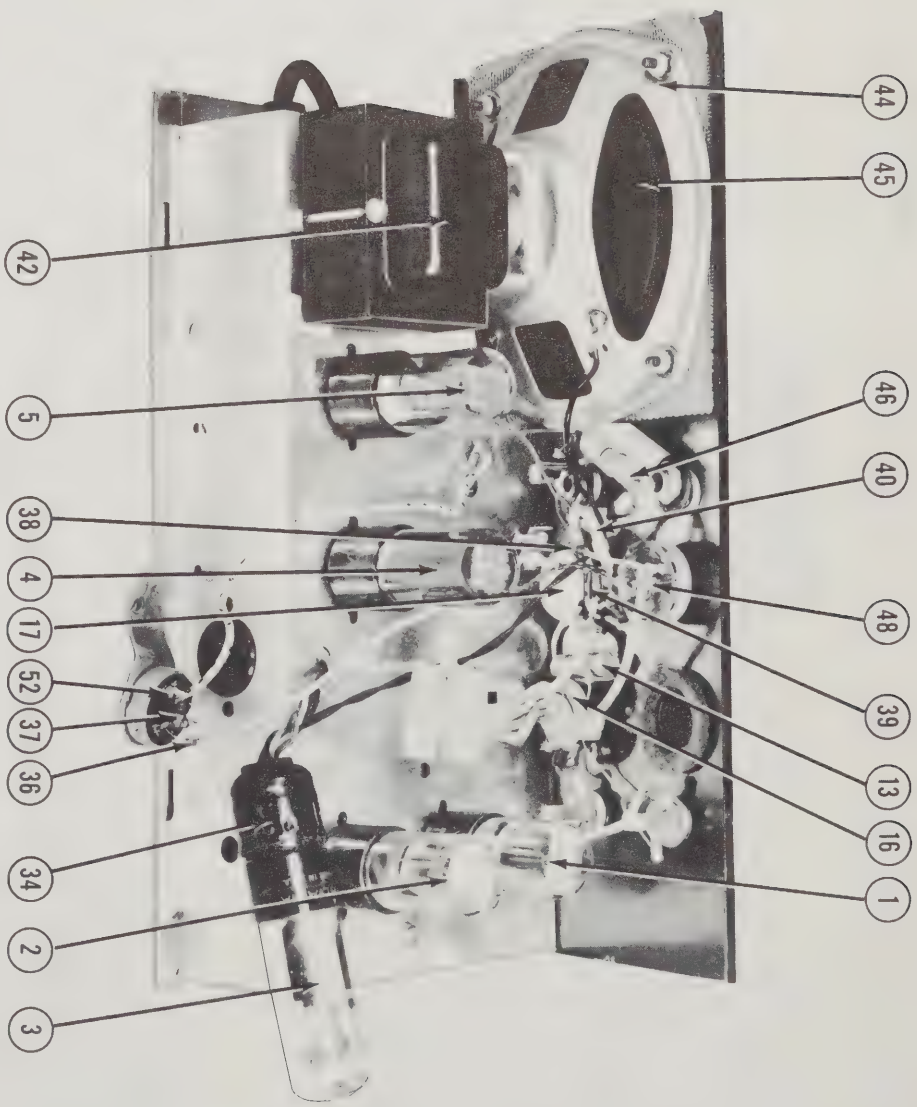
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	
16A	500KΩ	½		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 16A per instructions
17A	500KΩ	½		D13-133	M-60-Z	Tone Control
B	Shaft			A	Not Req.	Attach to 17A per instructions
18	50Ω	2		W-50	43-50	Hum-Balance Control
19A	500KΩ	½		D11-133	M-58-S	Bias Control
B	Shaft			A	Not Req.	Attach to 19A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	
20	3 Meg.	½		BTS-3.3 Meg.	Or.-Blk.-Grn. Mic. Amp. Grid
21	1000Ω	½		BTS-1000	Br.-Blk.-Red Mic. Amp. Cathode
22	270KΩ	½		BTS-270K	Red-Vi.-Yl. Mic. Amp. Plate Load
23	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Radio Input Shunt
24	27KΩ	½		BTS-27K	Red-Vi.-Or. Decoupling-See Note 1
25	2200Ω	½		BTS-2200	Red-Red-Red 1st AF Cathode
26	47KΩ	½		BTS-47K	Yl.-Vi.-Or. 1st AF Plate Load
27	5000Ω	½		BTS-4700	Grn.-Blk.-Red 2nd AF Cathode
28	47KΩ	½		BTS-47K	Yl.-Vi.-Or. 2nd AF Plate Load
29	27KΩ	½		BTS-27K	Red-Vi.-Or. Decoupling
30	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
31	250Ω	2		BW-2-270	Red-Grn.-Br. Output Cathode
32	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Feedback
33	5000Ω	½		BTS-4700	Grn.-Blk.-Red Tone Compensation
34	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tuning Eye Plate Load
35	3 Meg.	½		BTS-3.3 Meg.	Or.-Blk.-Grn. Tuning Eye Grid
36	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Series Cutter
37	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. Cutter Shunt
38	10KΩ	½		BTS-10K	Br.-Blk.-Or. Cutter Shunt
39	75Ω	1		BW-1-68	Vi.-Grn.-Blk. Series Speaker-See Note 2
40	4Ω	2		BW-2-3.9	Yl.-Blk.-Blk. Speaker Shunt

Note 1 - Some models use 47KΩ in this application.
Note 2 - Some models use two 150Ω resistors in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: MASCO PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
41	.06	90Ω	.9 Henries		C-1706†	T20C53†	C-2975†	†Drill one new mounting hole.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
42	117V AC @ .38A	480V CT @ .06A	6.5V AC @ 2.0A		A-6D	P-6119*	T22R02*	P-2851*

*Drill new mounting holes and add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
43	8600Ω	3.4Ω	440Ω	.45Ω	O-6S	A-3824	T22S88	A-2932†	†Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA: JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-108		
44	PM	3.4Ω	AM-6	Mod. P6-X		
	CONE DIA.	VC DIA.				
45	5-3/4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA	INSTALLATION NOTES
46	Bayonet	6-8	0.15	Brown			Type 47

CRYSTAL CUTTER

ITEM No.	REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA: ASTATIC PART No.	REMARKS
47		X-26	

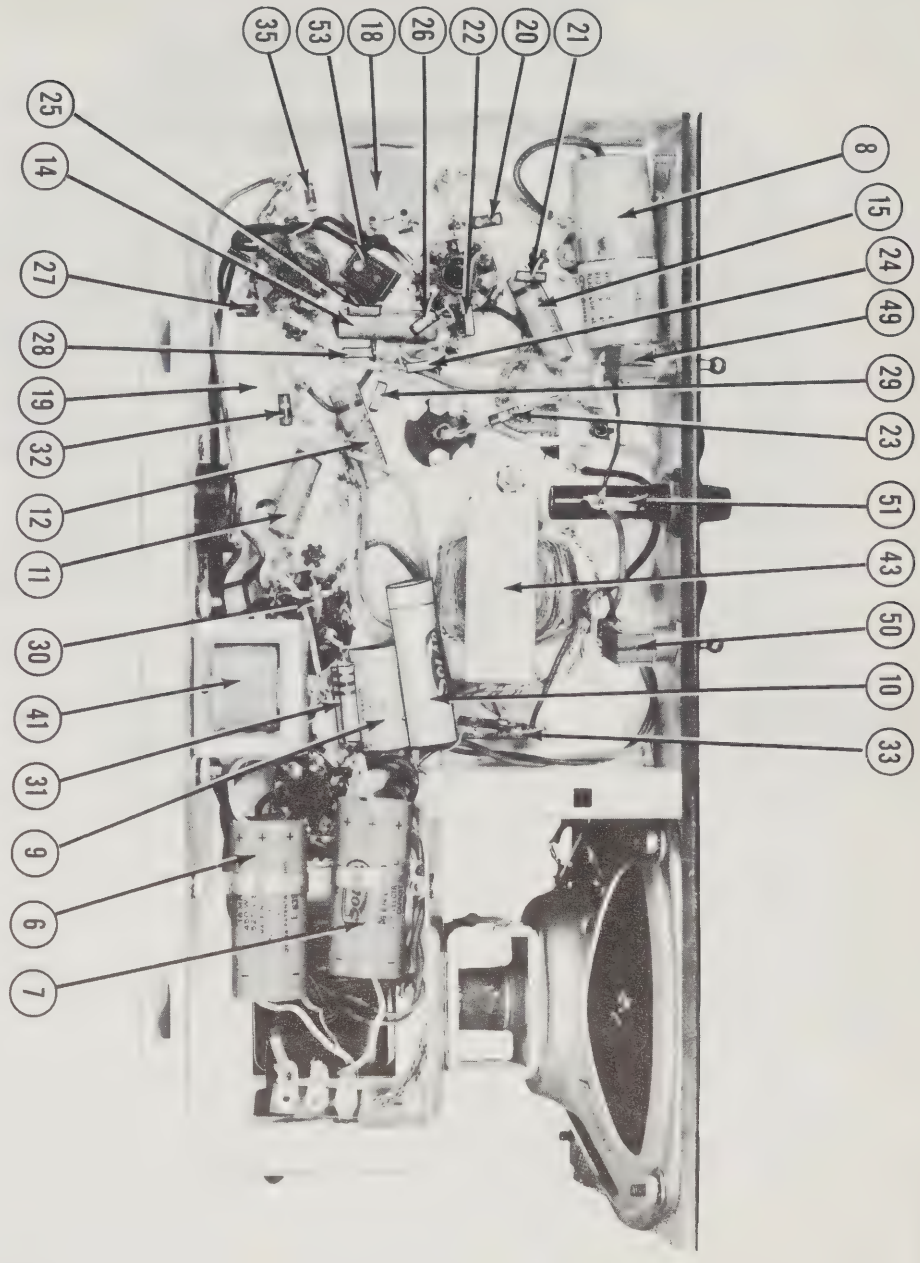
MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
48	Switch		Playback-Record
49	"		Motor On-Off (SPST)
50	"		Amplifier On-Off (SPST)
51	Fuse		2 Amp.
52	Switch		Speed Change

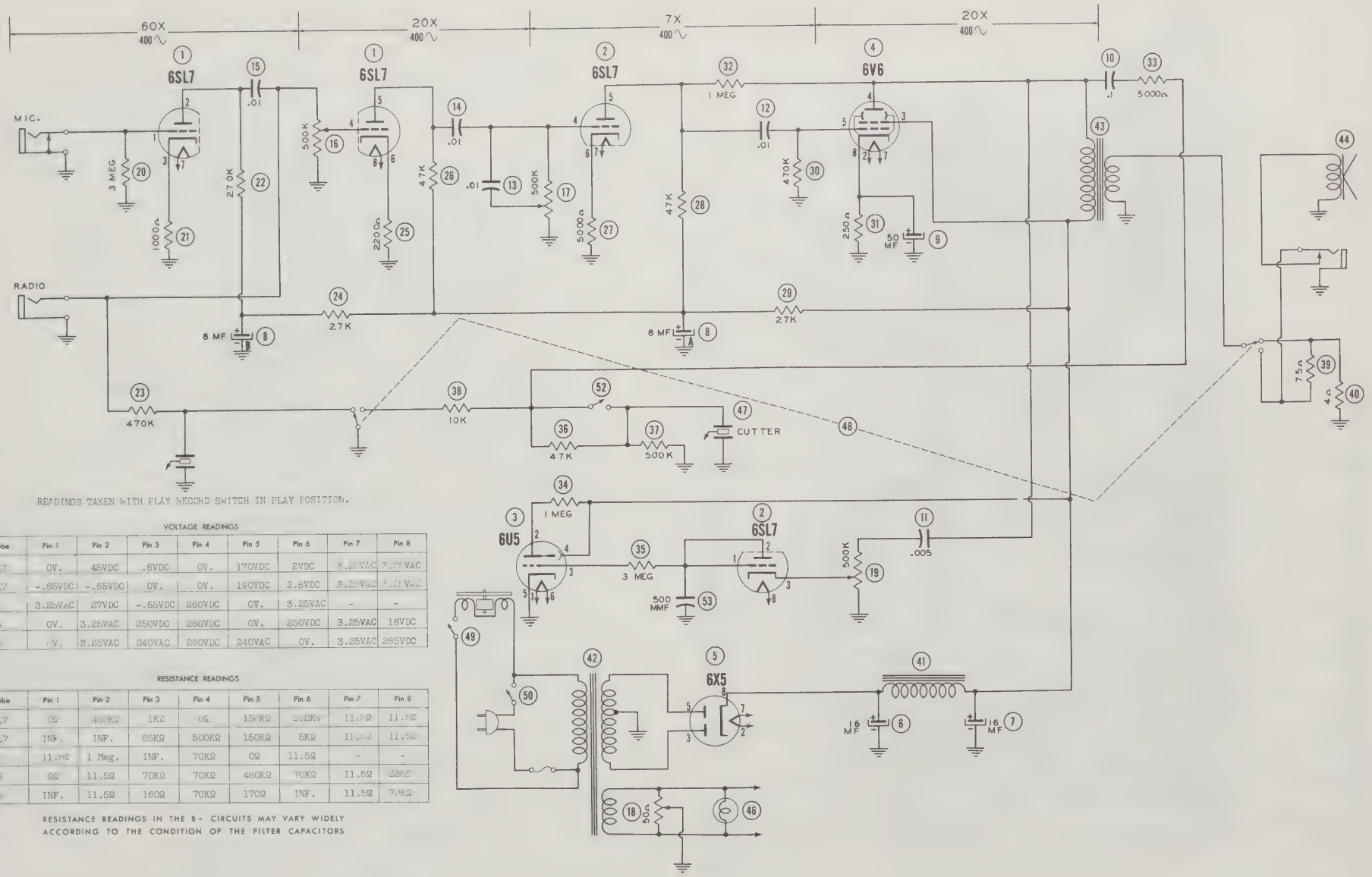
DISASSEMBLY INSTRUCTIONS

1. Remove four wood screws holding cover board over top of chassis.
2. Remove four wood screws holding player mounting board in cabinet.
3. Unsolder leads from RPM switch from chassis.
4. Remove phono-pickup plug from chassis.
5. Remove phono-motor plug from chassis.
6. Remove record player from cabinet.
7. Unsolder leads from speaker.
8. Remove four hex nuts holding chassis in cabinet. Remove chassis from cabinet.
9. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

CHASSIS—BOTTOM VIEW



MASCO MODEL RK-5



READINGS TAKEN WITH PLAY RECORD SWITCH IN PLAY POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SL7	0V.	45VDC	.6VDC	0V.	170VDC	2VDC	3.25VAC	3.25VAC
2	6SL7	-.65VDC	-.65VDC	0V.	0V.	190VDC	2.8VDC	3.25VAC	3.25VAC
3	6U5	3.25VAC	27VDC	-.65VDC	260VDC	0V.	3.25VAC	-	-
4	6V6	0V.	3.25VAC	250VDC	260VDC	0V.	250VDC	3.25VAC	16VDC
5	6X5	0V.	3.25VAC	240VAC	260VDC	240VAC	0V.	3.25VAC	265VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SL7	0Ω	400KΩ	1KΩ	0Ω	15KΩ	5.2KΩ	11.5Ω	11.5Ω
2	6SL7	INF.	INF.	65KΩ	500KΩ	150KΩ	5KΩ	11.5Ω	11.5Ω
3	6U5	11.5Ω	1 Meg.	INF.	70KΩ	0Ω	11.5Ω	-	-
4	6V6	0Ω	11.5Ω	70KΩ	70KΩ	480KΩ	70KΩ	11.5Ω	325Ω
5	6X5	INF.	11.5Ω	160Ω	70KΩ	170Ω	INF.	11.5Ω	70KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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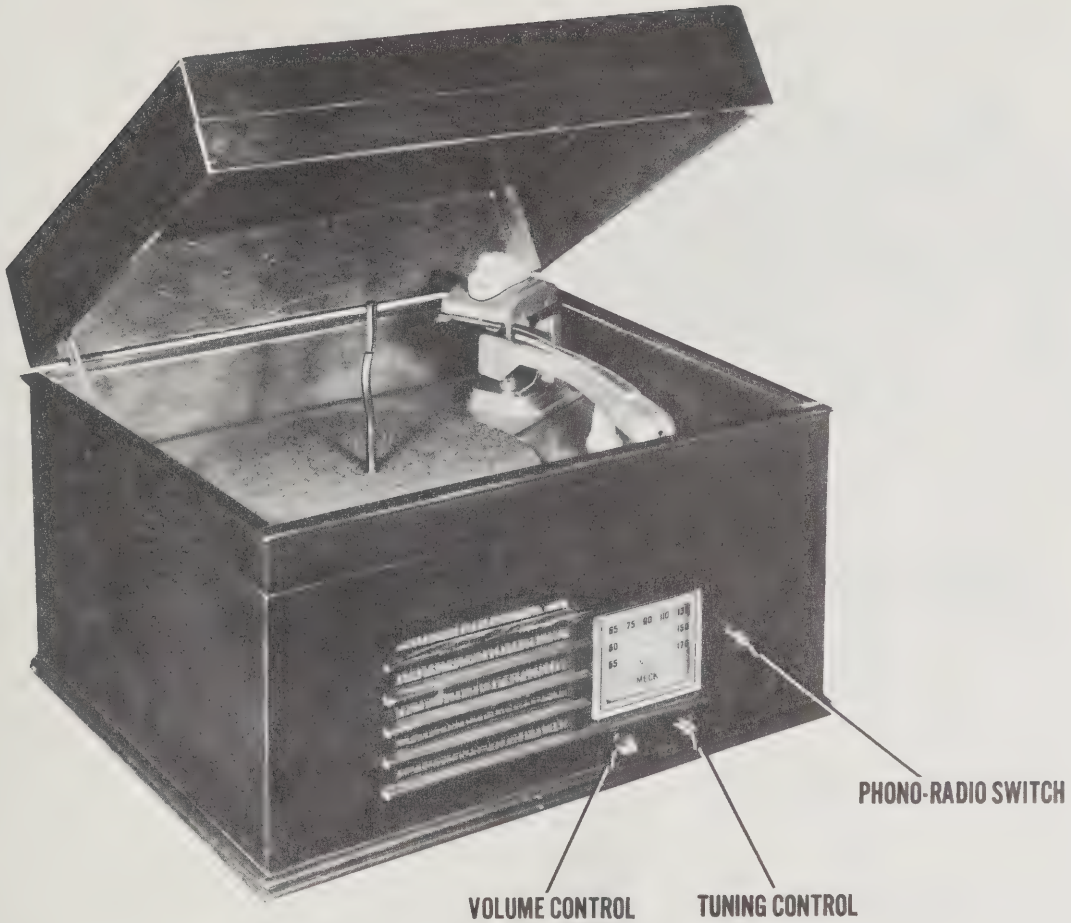
1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

MECK MODEL CD-500
(PX-5C5-EW-19



MECK MODEL CD-500
(PX-5C5-EW-19

MECK MODEL CD-500 (PX-5C5-EW19)

TRADE NAME	Meck, Model CD-500 (PX-5C5-EW-19)
MANUFACTURER	John Meck Industries, Plymouth, Indiana
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1740KC RATING .28 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	200MMFD	High side to ext. ant. lug. Low side to ext. ground lug.	1740KC	"	"	A5	Adjust for maximum output.
3	200MMFD	"	1500KC	Tune for maximum output.	"	A6	" " " "

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DATE 2/48 SET #33 FOLDER #483-12

PARTS LIST AND DESCRIPTIONS

MECK MODEL CD-[illegible]
(TX-[illegible]-1.)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MECK PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1A	Converter	12SA7	12SA7	8R	
B	"	14A7	14A7	8AL	
C	"	12BE6	12BE6	7CH	
2A	IF Amp.	12SK7	12SK7	7N	
B	" "	14A7	14A7	8V	
C	" "	12BA6	12BA6	7BK	
3A	Det.-AVC-AF	12SQ7	12SQ7	7A	
B	" " "	14S6	14S6	8W	
C	" " "	12AT6	12AT6	7BT	
4A	Power Output	50L6GT	50L6GT	7AC	
B	" "	50A5	50A5	8AA	
C	" "	50B5	50B5	7BZ	
5A	Rectifier	35Z5GT	35Z5GT	6AD	
B	"	35W4	35W4	5BA	
C	"	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MECK PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	50	150		DSB-5030-150	TA530	PRSA150-30-50	EDL5315	Filter - Grn.
B	30	150						" - Red
7	.05	400	CP-14503	MPH-4-05	TC-15	484-05	DT4S5	Line Filter
8	.05	400	CP-14503	S-4-05	TC-15	484-05	DT4S5	Output Plate Bypass
9	.01	600	CP-14103	S-6-01	TC-11	684-01	DT6S1	Audio Coupling
10	.01	400		S-4-01	TC-11	484-01	DT4S1	Phono Shunt
11	.01	400	CP-12103	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
12	.05	400	CP-12503	S-4-05	TC-15	484-05	DT4S5	AVC Filter
13	200	500	CM-15251	MO.5-32	1FM-32	1468-0002	5W5T2	AF Plate Bypass-Cer.
14	200	500	CM-15251	MO.5-32	1FM-32	1468-0002	5W5T2	Diode RF Filter-Cer.
15	50	500	CM-15500	MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.-Cer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MECK PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	1 Meg.	½	VC-10105	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 16A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

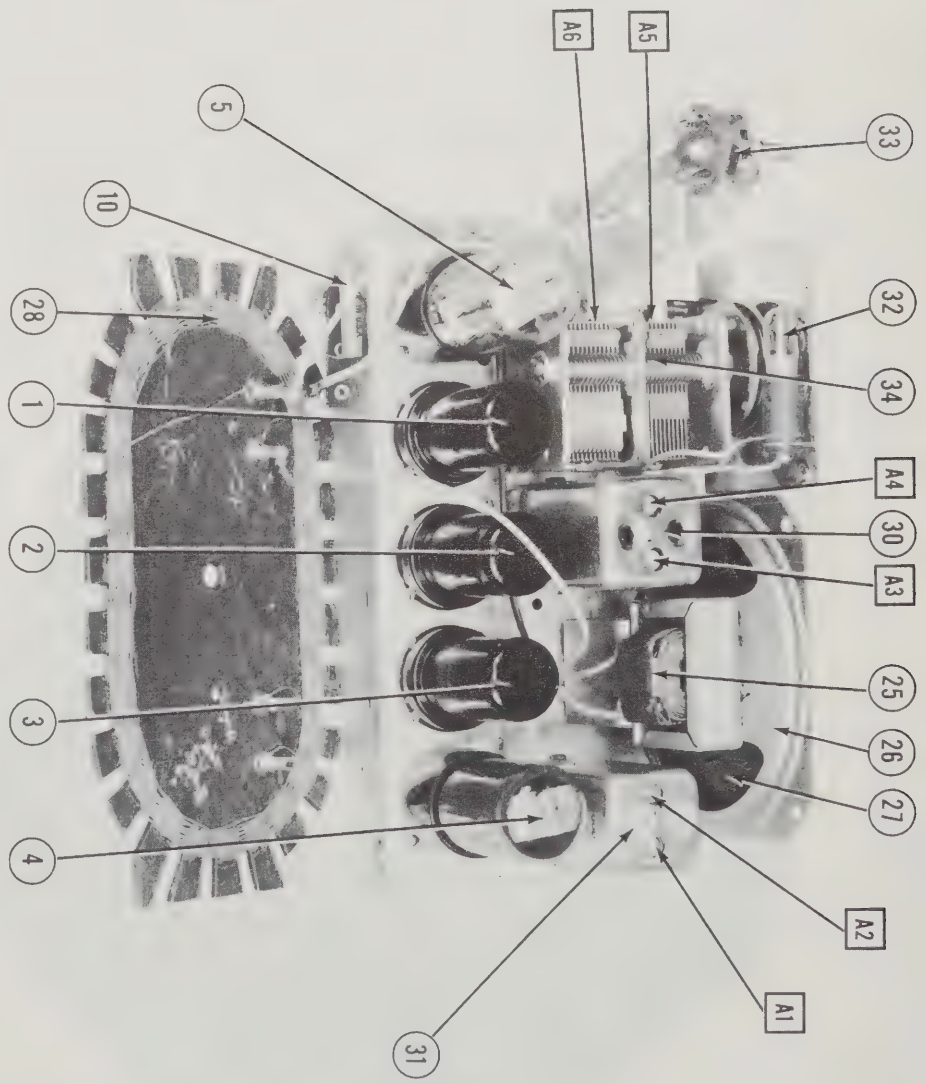
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MECK PART No.	IRC PART No.	IDENTIFICATION CODES
17	22KΩ	½	RC-32002	BTS-22K	Red-Red-Or. Oscillator Grid
18	68Ω	½	RC-30680	BW-½-68	Blue-Gray-Blk. IF Cathode-See Note
19	2.2 Meg.	½	RC-32004	BTS-2.2 Meg	Red-Red-Grn. AVC Network
20	10 Meg.	½	RC-31005	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
21	250KΩ	½	RC-32503	BTS-270K	Red-Grn.-Yl. AF Plate Load
22	470KΩ	½	RC-35003	BTS-470K	Yl.-Vi.-Yl. Output Grid
23	150Ω	½	RC-31500	BW-½-150	Br.-Grn.-Br. Output Cathode
24	1000Ω	1		BTA-1000	Br.-Blk.-Red Filter

Note-Not used in all models.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MECK PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
25	1.80Ω	3.2Ω	168Ω	.9Ω	TO-10000	A-3878*	T2S45*	A-2028*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	VC IMP.	MECK PART No.	JENSEN PART No.		
26	PM	3..Ω	SO-10000			
	CONE DIA.	VC DIA.				
27	3-15/16"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

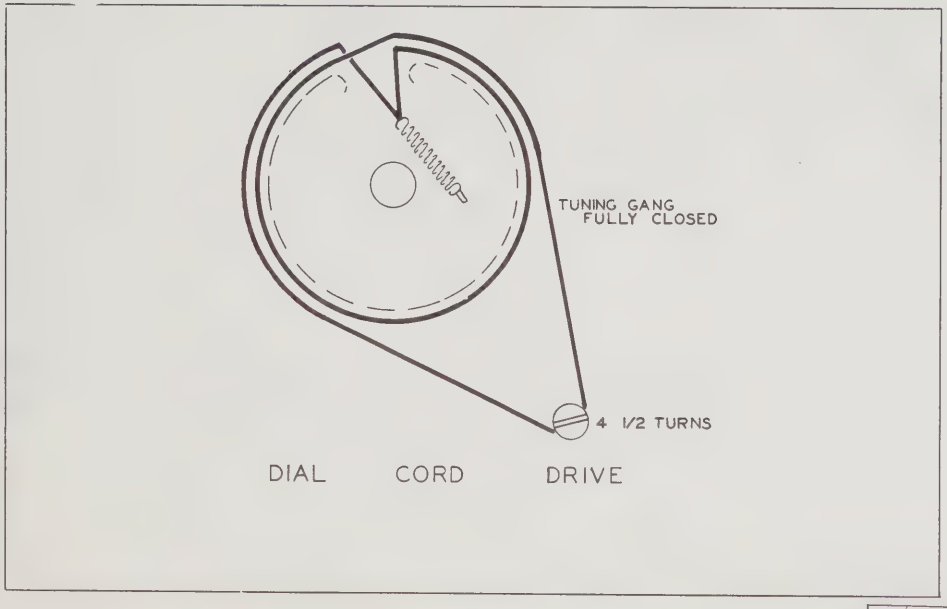
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MECK PART No.	MEISSNER PART No.	
28	Loop Ant.	0Ω	2Ω	AL-10003		
29	Osc. Coil		5.5Ω	TRC-10000D	14-1040	
30	Input IF	20Ω	20Ω	TS-10000	16-6658	
31	Output IF	19Ω	19Ω	TS-10001	16-6660	

DIAL LIGHT

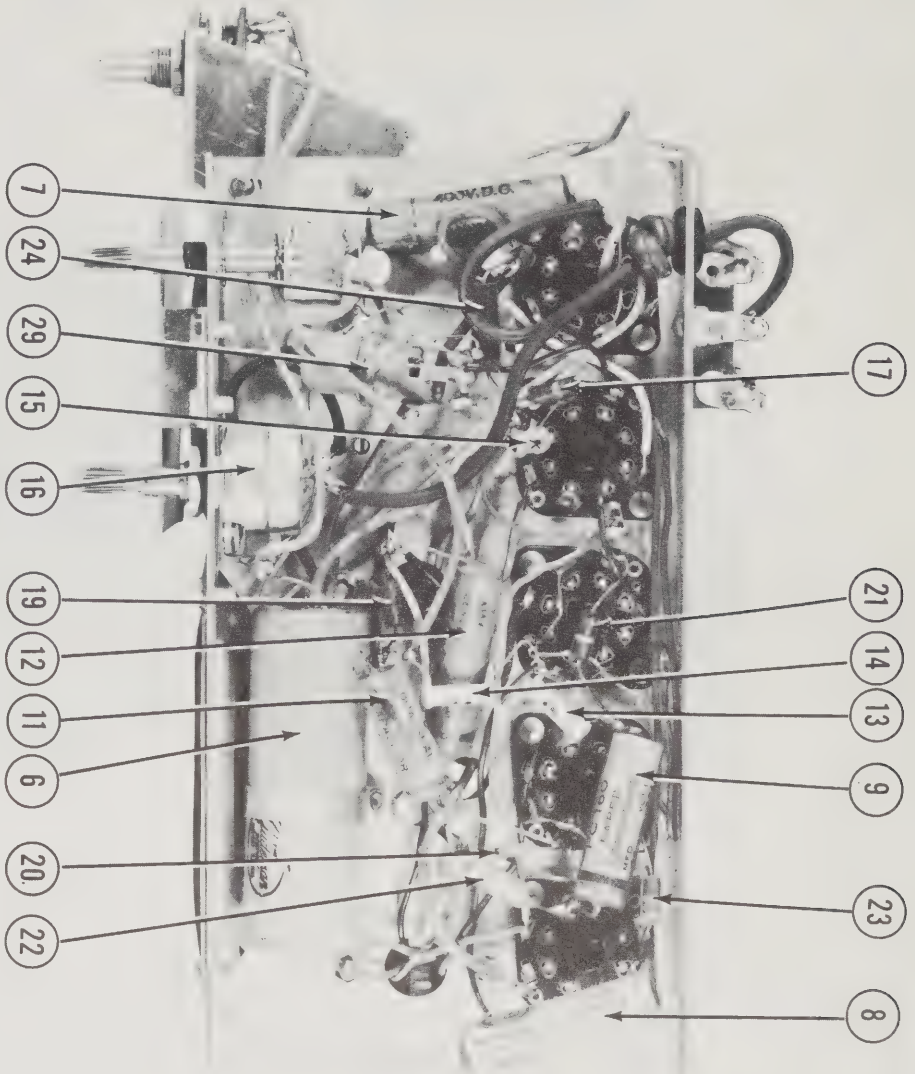
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MECK PART No.		
32	Bayonet	6-8	0.15	Brown			Type 47

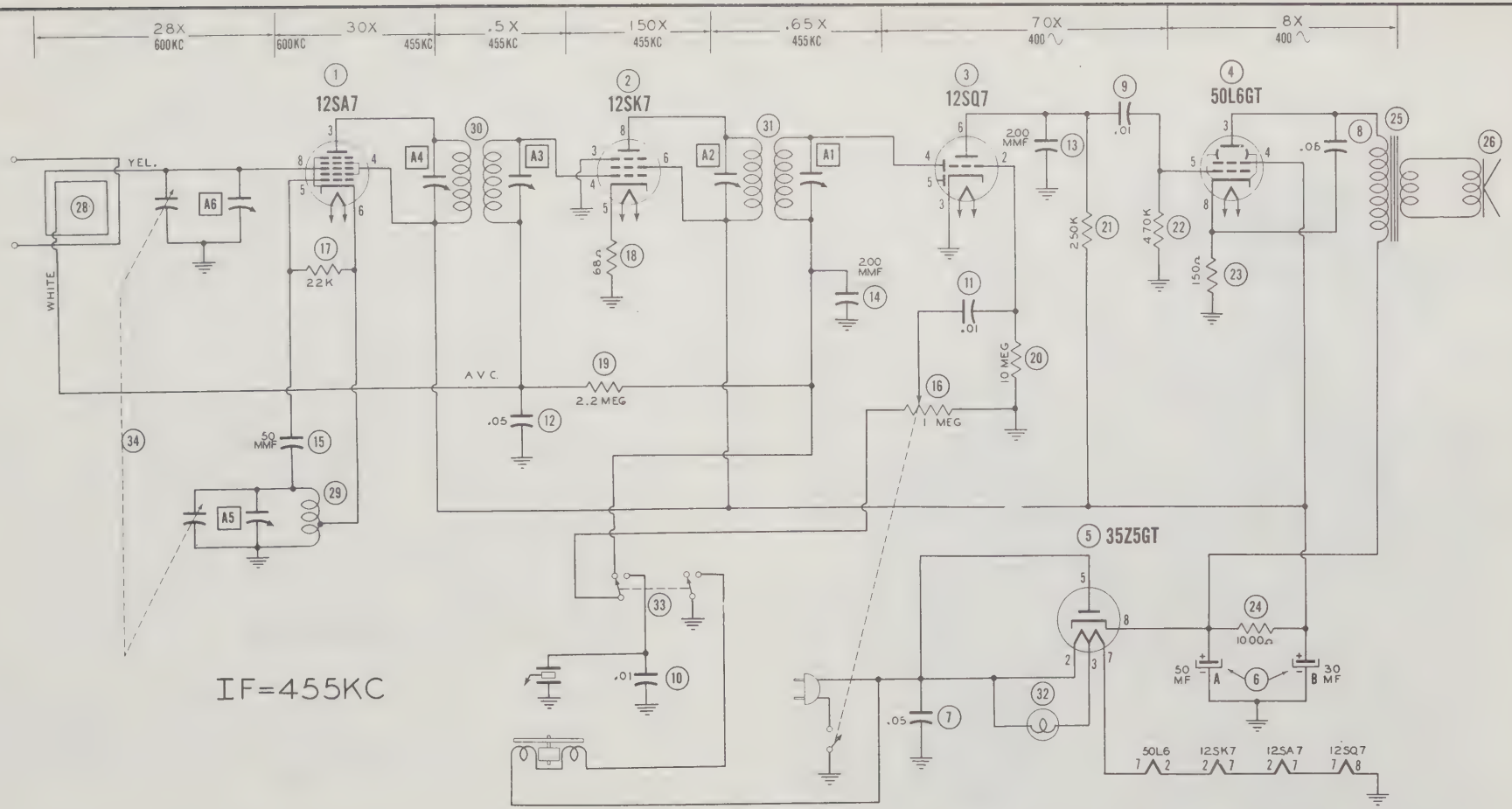
MISCELLANEOUS

ITEM No.	PART NAME	MECK PART No.	NOTES
33	Switch	VS-10000	Radio-Phono
34	2 Gang Var.Cap.	CV-10002-E	(25-477MMF, 30-195MMF)



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	6V.	2.5VAC	0V.	0V.	-1.5VDC	0V.	2.5VAC	-.4VDC
2	12SK7	6V.	2.5VAC	0V.	-.4VDC	0V.	85VDC	25VAC	0V.
3	12SQ7	6V.	-.8VDC	0V.	-.4VDC	-1.5VDC	87VDC	2.5VAC	0V.
4	50L6GT	0V.	0V.	117VAC	117VDC	0V.	0V.	0V.	117VDC
5	35Z5GT	0V.	117VAC	115VAC	0V.	117VAC	0V.	87VAC	127VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	1MΩ	220Ω	0Ω	220Ω	1MΩ	0Ω	1MΩ	220Ω
2	12SK7	1MΩ	220Ω	0Ω	220Ω	1MΩ	60KΩ	220Ω	0Ω
3	12SQ7	1MΩ	1MΩ	0Ω	1MΩ	INF.	310KΩ	1MΩ	0Ω
4	50L6GT	INF.	1MΩ	0Ω	0Ω	470KΩ	INF.	87Ω	150Ω
5	35Z5GT	INF.	116Ω	116Ω	INF.	116Ω	INF.	87Ω	60KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

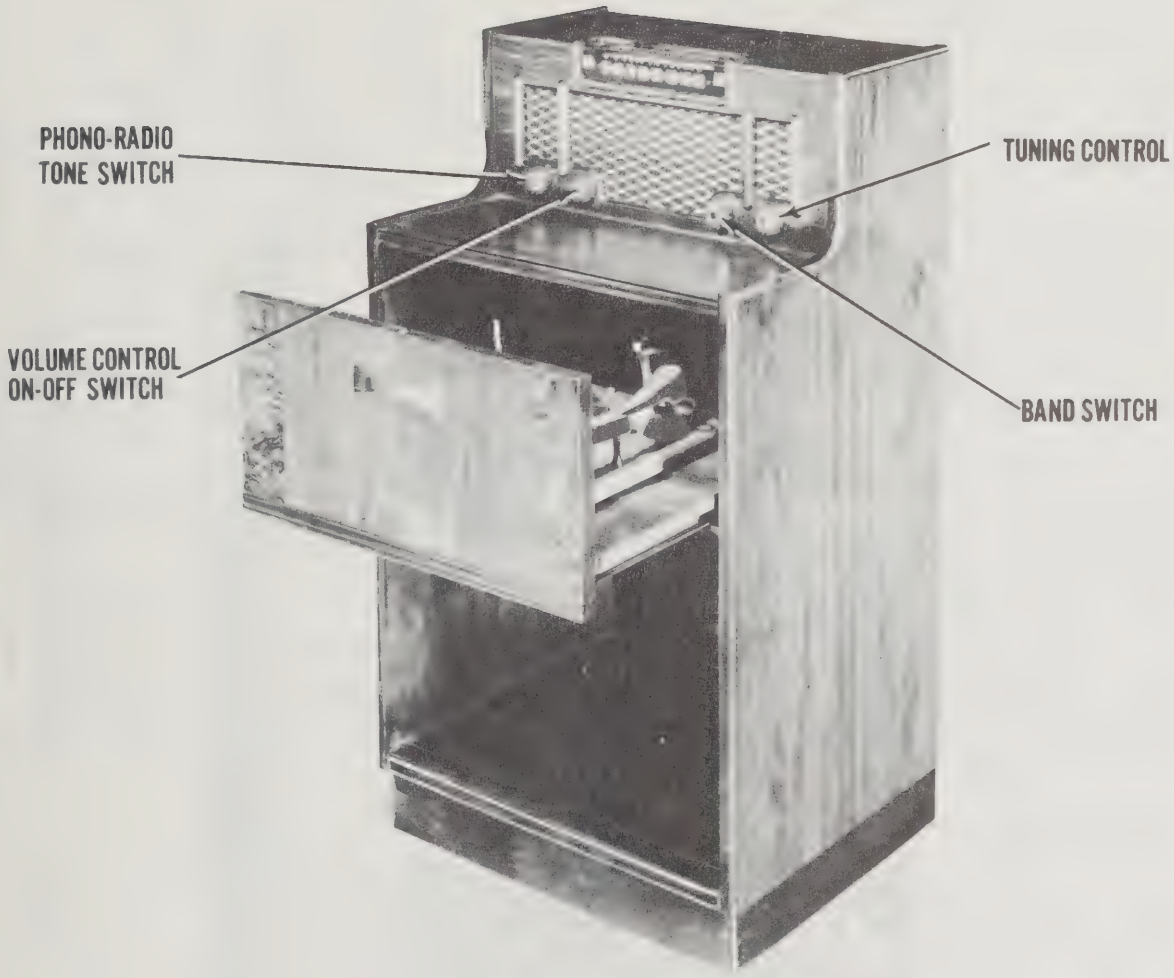
1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

PHOTOFACT* Folder

*TRADE MARK

MOTOROLA MODELS 77FM21 (Ch. HS-89), 77FM22, 77FM22M, 77FM22WM, 77FM23 (Ch. HS-97)

MOTOROLA MODELS 77FM21 (Ch. HS-89), 77FM22, 77FM22M, 77FM22WM, 77FM23 (Ch. HS-97)



MOTOROLA MODELS 77FM21 (Ch. HS-89), 77FM22, 77FM22M, 77FM22WM, 77FM23 (Ch. HS-97) PAGE 1

MOTOROLA MODEL 77FM21 (Ch. HS-89)

TRADE NAME	Motorola, Models 77FM21 (Ch. HS-89), 77FM22, 77FM22M, 77FM22WM, 77FM23 (Ch. HS-97)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver with Loop Ant.
TUBES (SIX)	Types, 12AT7 1st & 2nd FM Converter, 12BE6 FM IF-BC Conv., 12BA6 IF Amp., 12BA6 IF Amp., 19T8 Det.-AVC-AF, 50B5 Power Output.
POWER SUPPLY	110-120 Volts AC RATING .34 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1620KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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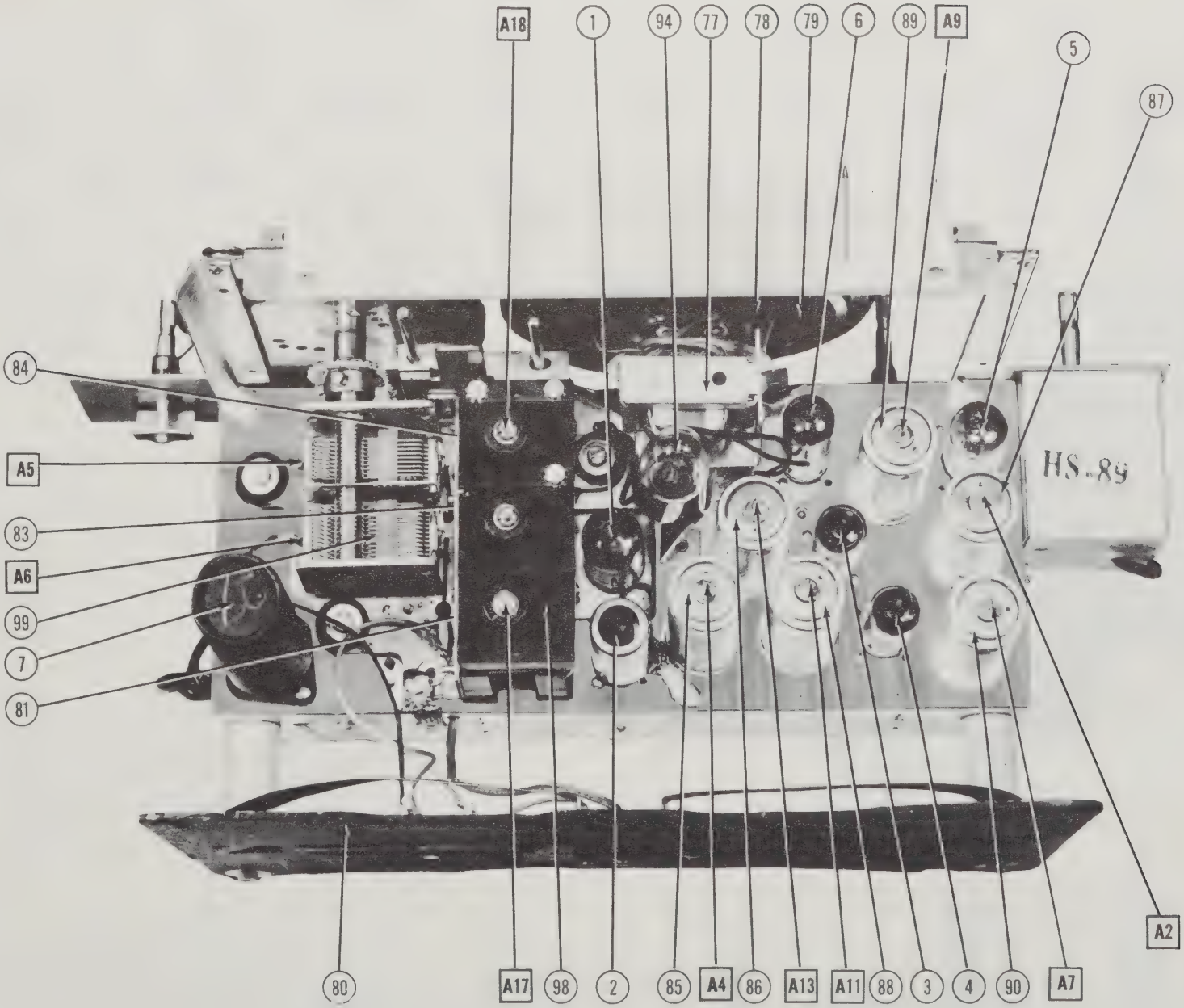
DATE 2/48 SET #33 FOLDER #483-13

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	1st & 2nd FM-Conv.	12AT7	12AT7		
2	FM-IF-BC Conv.	12BE6	12BE6	7CH	
3	IF Amp.	12BA6	12BA6	7BK	
4	IF Amp.	12BA6	12BA6	7BK	
5	Det.-AVC-AF	19T8	19T8		
6	Power Output	50B5	50B5	7B2	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	200		DY-403020-150	EL354	AF644D	UP42215	◘ Filter
B	20	150	23B470429					▲ "
C	20	150						"
8	.05	400	8S9816	MPH-4-05	TC-15	484-05	DT4S5	Line Filter
9	.02	400	8A471019	S-4-02	TC-12	484-02	DT4S2	Output Plate Bypass
10	.01	400	8S9809	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
11	.25	50	8A470504	S-4-25	TC-2	484-25	DT4P25	Bias Filter
12	.005	100	8A24966	S-4-005	TC-25	484-005	DT6D5	Audio Coupling
13	.01	400	8S9825	S-4-01	TC-11	484-01	DT4S1	IF Decoupling
14	.01	100	8S9801	S-4-01	TC-11	484-01	DT4S1	IF Cathode Bypass
15	.01	200	8S9825	S-4-01	TC-11	484-01	DT4S1	IF Decoupling
16	.01	100	8S9801	S-4-01	TC-11	484-01	DT4S1	AVC Filter
17	.01	200	8S9825	S-4-01	TC-11	484-01	DT4S1	RF Bypass Power Supply
18	.1	200	8K471636	S-4-1	TC-1	484-.1	DT4P1	" " " "
19	.01	200	8S9825	S-4-01	TC-11	484-01	DT4S1	FM Conv. Decoup.
20	.05	400	8A471623	S-4-05	TC-15	484-05	DT4S5	Line Isolation
21	.02	400	8S9802	S-4-02	TC-12	484-02	DT4S2	FM Conv. Cathode Bypass
22	.01	100	8S9801	S-4-01	TC-11	484-01	DT4S1	1st FM Cathode Bypass
23	.15	200	8A72686	S-4-1	TC-1	484-.15	DT4P1	Phono Isolation
24	.05	400	8K471635	S-4-05	TC-15	484-05	DT4S5	AVC Network
25	250		21K77375	MO.5-325	1FM-325	1468-00025	5W5T25	AF Plate Bypass-Cer.
26	4700		21B470567					Tone Comp. - Cer.
27	4700		21B470567					AF Cathode Bypass-Cer.
28	50		21K77373	MO.5-45	1FM-45	1468-00005	5W5Q5	Disc. Diode Filter-Cer
29	500	500	21R6639	MO.5-35	1FM-35	1468-0005	5W5T5	De-emphasis
30	100		21B77286	MO.5-31	1FM-31	1468-0001	5W5T1	Diode RF Filter-Cer.
31	100		21B77286	MO.5-31	1FM-31	1468-0001	5W5T1	" " " "
32	50		21K77373	MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.-Cer.
33	250	500	21R2729	MOS.5-325		1469-00025	5R5T25	Osc. Coupling
34	250	500	21R2729	MOS.5-325		1469-00025	5R5T25	RF Coupling
35	500	500	21R2730	MOS.5-35	MS-35	1469-0005	5R5T5	FM Conv. Cathode Byp.
36	1000	500	21R6638	MO.5-21	1FM-21	1468-001	1W5D1	Filament Bypass
37	1000	500	21R6638	MO.5-21	1FM-21	1468-001	1W5D1	" "
38	1000	500	21R6638	MO.5-21	1FM-21	1468-001	1W5D1	" "
39	250	500	21R2729	MO.5-325	1FM-325	1468-00025	5W5T25	Tone Compensation
40	50	500	21R6642	MO.5-45	1FM-45	1468-00005	5W5Q5	Antenna Coupling
41	25		21K28816	MO.5-425	MS-425	1468-000025	5W5Q25	IF Coupling-Cer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
42A	500KΩ	½	18A76191	D17-133X	AT-51	Volume Control tapped @ 25KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 42A per instructions
C	Switch		" "	41	SW-A	" " " " "

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	IDENTIFICATION CODES
43	220KΩ	½	6R6015	BTS-220K	Red-Red-Yl. AVC Network
44	1 Meg.	½	6R6004	BTS-1 Meg.	Br.-Blk.-Grn. 1st FM Converter Grid
45	15KΩ	1	6R3996	BTA-15K	Br.-Grn.-Or. 1st FM Converter Plate Load
46	1 Meg.	1/8	6R6046	BTS-1 Meg.	Br.-Blk.-Grn. 2nd FM Converter Grid
47	22KΩ	½	6R6028	BTS-22K	Red-Red-Or. 2nd FM Converter Plate Decoupling
48	22KΩ	½	6R6028	BTS-22K	Red-Red-Or. Osc. Grid
49	220KΩ	½	6R6015	BTS-220K	Red-Red-Yl. Line Isolation
50	27KΩ	½	6R6434	BTS-27K	Red-Vi.-Or. 1st IF Transformer Shunt
51	22KΩ	½	6R6028	BTS-22K	Red-Red-Or. 2nd IF Transformer Shunt
52	68Ω	½	6R2039	BW-½-68	Blue-Gray-Blk. 2nd IF Cathode
53	1000Ω	½	6R6301	BTS-1000	Br.-Blk.-Red Decoupling
54	220Ω	½	6R3933	BW-½-220	Red-Red-Br. 1st IF Cathode
55	22KΩ	½	6R6028	BTS-22K	Red-Red-Or. 3rd IF Transformer Shunt
56	68Ω	½	6R2039	BW-½-68	Blue-Gray-Blk. 3rd IF Cathode
57	1000Ω	½	6R6301	BTS-1000	Br.-Blk.-Red 3rd IF Decoupling
58	2.2 Meg.	½	6R3927	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
59	47KΩ	½	6R6056	BTS-47K	Yl.-Vi.-Or. Diode Filter
60	220KΩ	½	6R6015	BTS-220K	Red-Red-Yl. AVC Network
61	220KΩ	½	6R6015	BTS-220K	Red-Red-Yl. Disc. Diode Load
62	68KΩ	½	6R6001	BTS-68K	Blue-Gray-Or. Disc. Diode Load
63	150KΩ	½	6R6182	BTS-150K	Br.-Grn.-Yl. Disc. Diode Load
64	33KΩ	1/8	6R6410	BTS-33K	Or.-Or.-Or. Disc. Transformer Shunt
65	100KΩ	½	6R6075	BTS-100K	Br.-Blk.-Yl. De-emphasis.
66	100Ω	½	6R6018	BW-½-100	Br.-Blk.-Br. AF Cathode
67	4.7 Meg.	1/8	6R2122	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
68	100KΩ	½	6R6075	BTS-100K	Br.-Blk.-Yl. AF Plate Load
69	1200Ω	½	6R6393	BTS-1200	Br.-Red-Red Bias Network
70	1200Ω	½	6R6393	BTS-1200	Br.-Red-Red " "
71	470KΩ	½	6R6032	BTS-470K	Yl.-Vi.-Yl. Output Grid
72	150Ω	1	6R6293	BW-1-150	Br.-Grn.-Br. Output Cathode
73	27Ω	2	6R3994	BW-2-27	Red-Vi.-Blk. Surge Limiter
74	180Ω	2	6R3968	BW-2-180	Br.-Gray-Br. Filter
75	1000Ω	2	6R476004	BT-2-1000	Br.-Blk.-Red Filter
76	470KΩ		6R6032	BTS-470K	Yl.-Vi.-Yl. Series Phono

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MOTOROLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
77	2250Ω	3.3Ω	240Ω	.6Ω	25K471947	A-3876*	T22S45*	A-2028*	*Fabricate new mounting bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: MOTOROLA PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-107†		†Drill and tap magnet frame.
78	PM	3.3Ω	50C470684	Mod. P5-V		
	CONE DIA.	VC DIA.				
79	4-3/4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: MOTOROLA PART No.	MEISSNER PART No.
80	Loop Ant. Coil		2.3Ω	24K470674	
81	FM Ant.Coil		0Ω		
82	BC Osc.Coil	1Ω	9Ω	24A470556	14-1040
83	FM Osc.Coil		0Ω		
84	FM Var. IF		0Ω		
85	AM Input IF	13Ω	13Ω	24B794e7	

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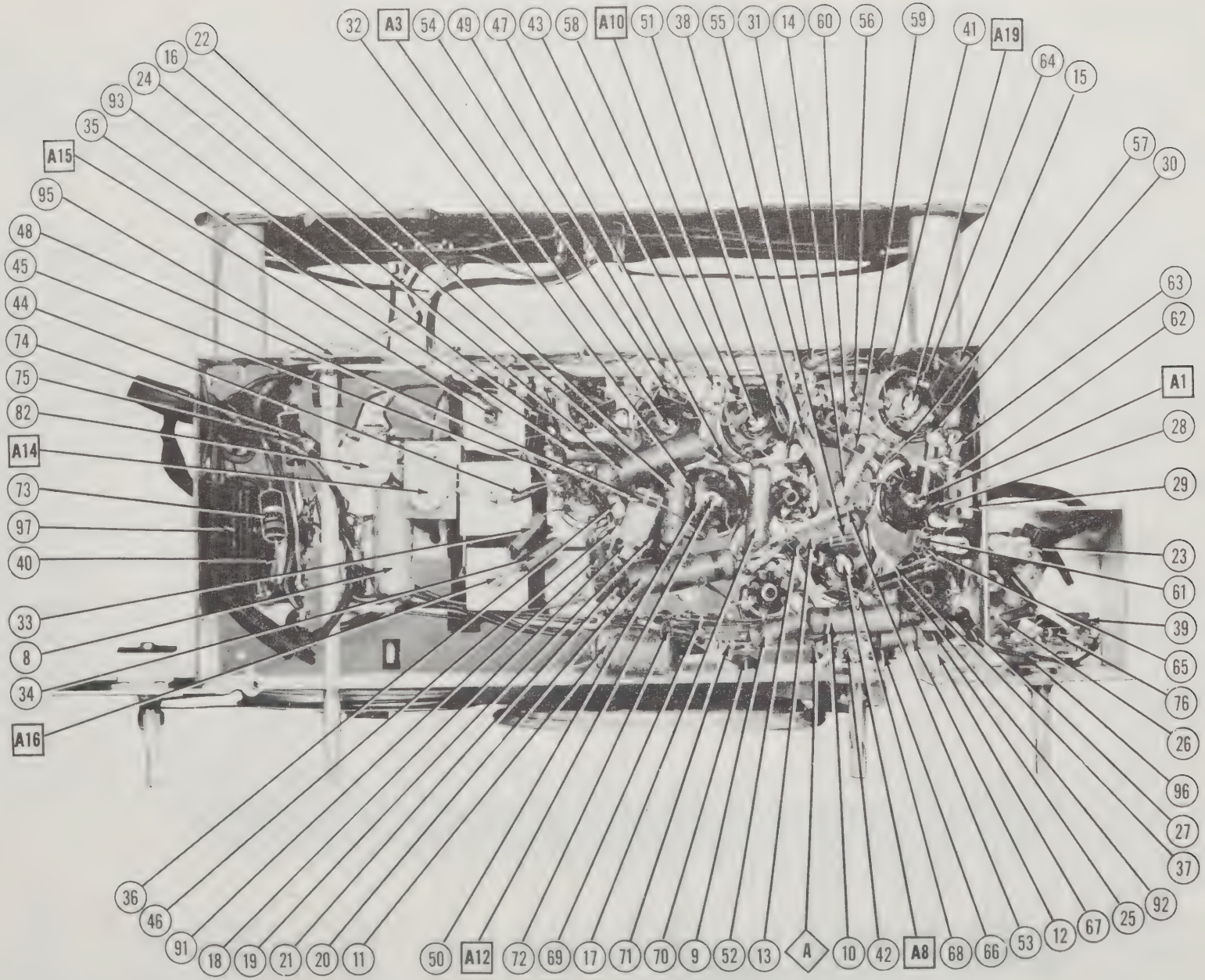
CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA MEISSNER PART No.
86	FM 1st IF	1Ω	1Ω	24B471668	
87	AM Output IF	14Ω	14Ω	24B471666	
88	FM 2nd IF	1Ω	1Ω	24B471670	
89	FM 3rd IF	1Ω	1Ω	24B471672	
90	FM Discr.	4Ω	3Ω	24B471674	
91	RF Choke		13Ω	24A470505	
92	" "		.1Ω	24A74989	
93	" "		.1Ω	[illegible]	

DIAL LIGHT

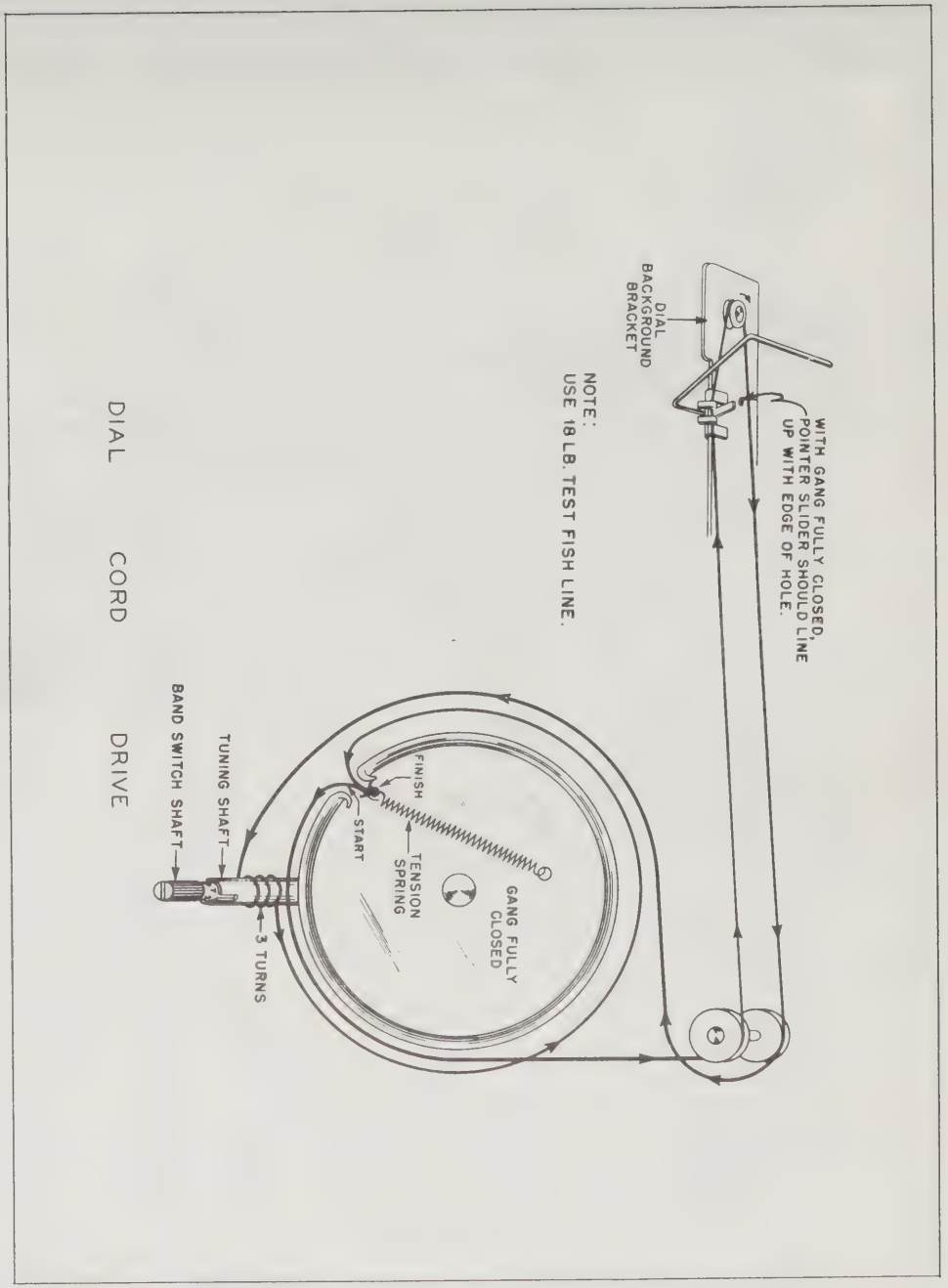
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA	INSTALLATION NOTES
94	Screw	1.0			68A470930		Type 37

MISCELLANEOUS

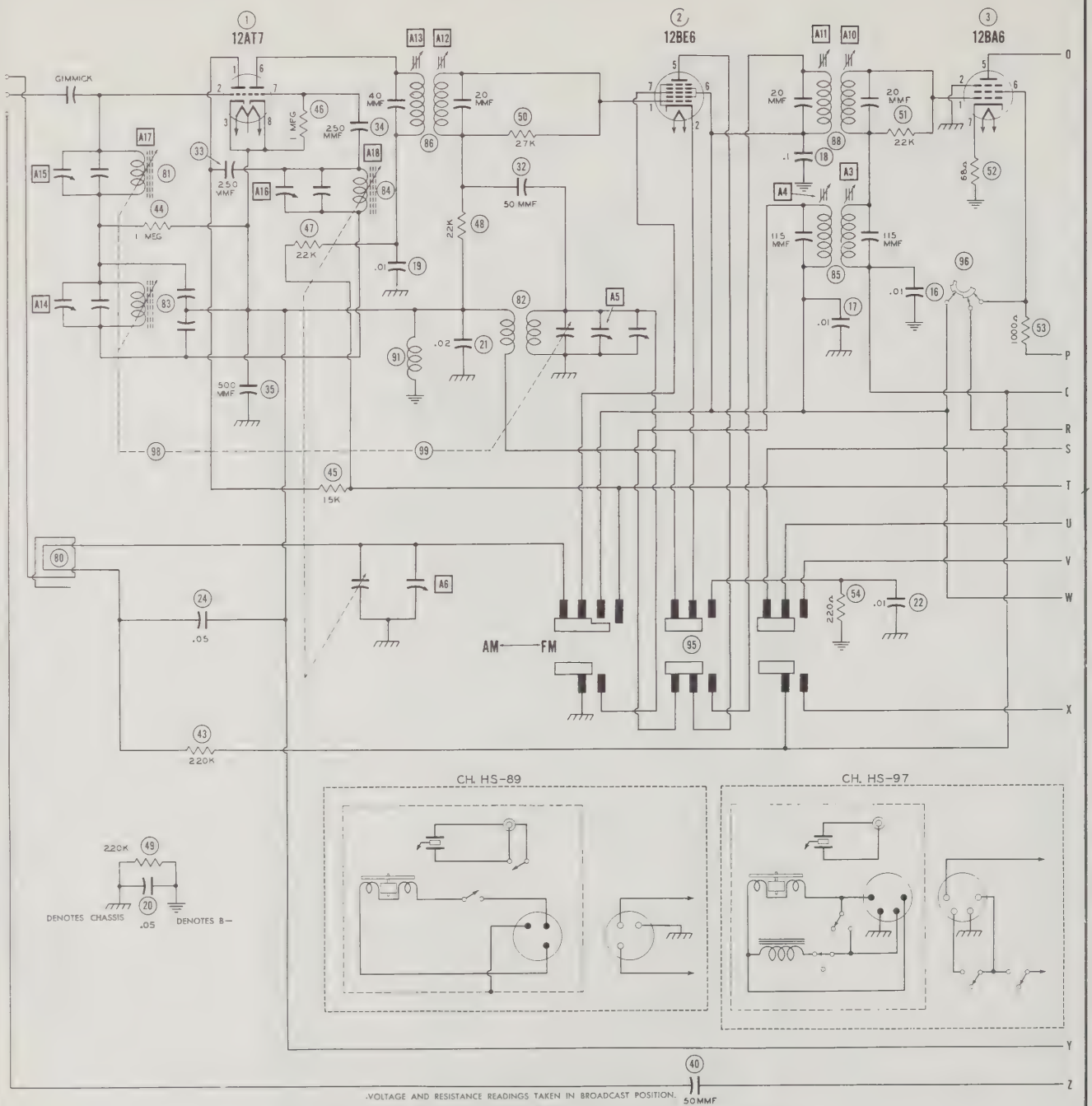
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
95	Switch	40B470432	Band
96	"	40K470076	Phono-Radio-Tone
97	Rectifier	48B90140	Selenium
98	Tuner Assby.	PT-14	
99	2 Gang Var.Cap.	19K75415	(43-481MMF, 22-189MMF)
A14	Trimmer	19A470426	FM Osc. Adj.
	Dial Pointer	52A77307	Pointer & Slider Assby.
	Dial Scale	34K470663	

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove two snap buttons holding loop antenna to cabinet.
3. Remove phono-pickup plug from under record changer.
4. Disconnect phono-motor plug from under record changer.
5. Remove three screws holding chassis in cabinet. Remove chassis from cabinet.



DATE 2/48



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
‡										
‡	2									
	2									
	3									
‡	4									
‡	5									
	5§									
	6									

IF=455KC AM

IF=4.3MC FM

RADIO-PHONO SWITCH IN RADIO POSITION
BANDSWITCH SHOWN IN BROADCAST POSITION

RADIO-PHONO SWITCH IN RADIO POSITION

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

§TAKEN WITH VACUUM TUBE VOLTMETER.

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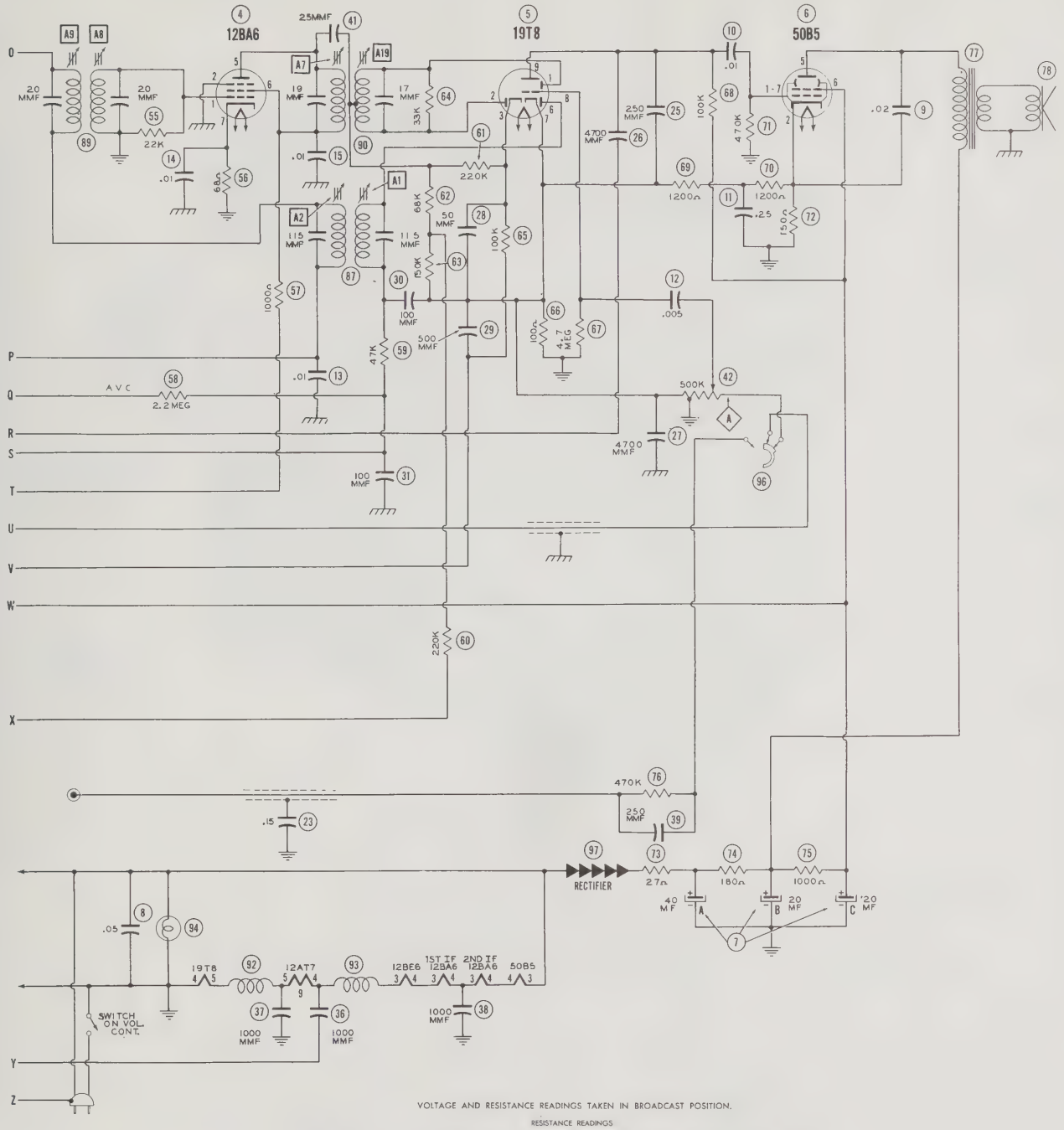
483-13

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
‡ 1	12BA6	0K	1 MEG.	1K	-	17K	-	.1 MEG.	1K	-
‡ 2A	19T8	-	-	-	75K	-	3K	-	-	-
2B	19T8	-	1K	-	3K	3K	-	7 MEG.	-	-
3	12AT7	3 MEG.	.1 MEG.	68K	4K	68K	3K	7K	-	-
‡ 4	12BE6	1K	.1 MEG.	41K	4K	-	7 MEG.	7K	-	-
‡ 5A	12BA6	1 MEG.	1 MEG.	.1 MEG.	-	17K	.1 MEG.	1	.1 MEG.	.1 MEG.
5B	12BA6	.4 MEG.	.4 MEG.	4 MEG.	-	1KΩ	68K	100Ω	.1 MEG.	1 MEG.
6	50B5	-	1 MEG.	-	43Ω	38KΩ	38KΩ	500KΩ	-	-

RADIO-PHONO SWITCH IN RADIO POSITION

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

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RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Before starting alignment set dial pointer per dial cord drawing.
Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 1 (grid) 12BE6. Low side to B-.	455KC	BC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.1 MFD.	"	1620KC	"	"	"	A5	Adjust for maximum output. Trimmer opposite A5 is a factory adjustment and normally need not be adjusted.
3		Loop	1400KC	"	Tune for maximum output.	"	A6	Adjust for maximum output

FM ALIGNMENT USING AM SIGNAL GENERATOR AND OUTPUT METER

Use amplitude modulated signal 400∿30% modulation.
Once the discriminator secondary has been adjusting (A19) no adjustment of the FM circuits should be attempted with an AM signal.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
4	.001MFD	High side to Pin 7 (grid) 12AT7. Low side to B-.	4.3MC	FM	Tuning slugs fully out.	Across voice coil	A7,A8, A9,A10 A11,A12 A13	Preset A13 by turning it out as far as possible. Then adjust A7 through A13 for maximum output.
5	DIRECT	Disconnect link on FM ant. terminals. High side to ext. FM ant. terminal. Low side to B-.	98MC	"	Turn tuning control until bakelite pieces of tuning unit are spaced 1-9/32" apart.	"	A14	Set spacing between osc. core and bakelite piece to which it is attached to two turns from tight by turning osc. core slotted nut. Then adjust A14 for maximum output.
6	DIRECT	"	90MC	"	Tune for maximum output.	"	A15, A16	Adjust for maximum output.
7	DIRECT	"	105MC	"	"	"	A17,A18	Adjust for maximum output. Repeat Steps 6 & 7 until no further improvement can be made.
8	DIRECT	"	105MC	"	"	"	A15 A16	Adjust for maximum output.
9		Reconnect FM ant. link. Use radiation loop.	"	"	"	"	A15	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
10	.001 MFD	High side to Pin 7 (grid) 12AT7. Low side to B-.	4.3MC	"	Tuning slugs fully out.	"	A19	Adjust for minimum output.

FM ALIGNMENT USING FM SIGNAL GENERATOR, OSCILLOSCOPE AND OUTPUT METER

Connect sync. sweep voltage from sig. gen. in series with 500KΩ potentiometer to horizontal input terminal of scope. Connect .002 MFD from horizontal input terminal to scope ground.
With adjustment of the potentiometer a single pattern should be obtained on scope. If not vary values of the potentiometer and the capacitor until this is possible. A single pattern should be used for all adjustments with scope.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4	.001MFD	High side to Pin 1 (grid) 12BA6 3rd IF Tube (4). Low side to B-.	4.3MC (freq. mod. 60∿ 250KC sweep)	FM	Tuning slugs fully out.	Vertical input to Point A. Ground to B-.	A7	Adjust for maximum amplitude of pattern per Fig. 1.
5	.001MFD	"	"	"	"	"	A19	Adjust for symmetrical pattern with peaks occuring at about 100KC above and below 4.3MC with maximum straightness of pattern between peaks. Repeat Steps 4 & 5 until no further improvement can be made.
6	.001MFD	High side to Pin 1 (grid) 12BA6 2nd IF Tube (3). Low side to B-.	4.3MC (freq. mod. 60∿ 200KC sweep)	"	"	"	A8,A9	Adjust for maximum straightness between peaks with peaks occuring at a slightly lower deviation.
7	.001MFD	high side to pin 1 (grid) 12BE6. Low side to B-.	"	"	"	"	A10,A11	Adjust for symmetrical pattern with maximum linearity between peaks.
8	DIRECT	Disconnect FM ant. link. High side to ext. FM ant. terminal. Low side to B-.	"	"	"	"	A12, A13	"
9	DIRECT	"	98MC (freq. mod. 400∿ 22½KC deviation)	"	Turn tuning control until bakelite pieces of tuning unit are 1-9/32" apart.	Across voice coil	A14	Set spacing between osc. core and the bakelite piece to which it is attached to two turns from tight by turning osc. core slotted nut. Then adjust A14 for maximum output.
10	DIRECT	"	90MC	"	Tune for maximum output.	"	A15, A16	Adjust for maximum output
11	DIRECT	"	105MC	"	"	"	A17, A18	Adjust for maximum output. Repeat Steps 10 & 11 until no further improvement can be made.
12	DIRECT	"	"	"	"	"	A15, A16	Adjust for maximum output.
13		Reconnect FM Ant. link. Use radiation loop.	"	"	"	"	A15	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

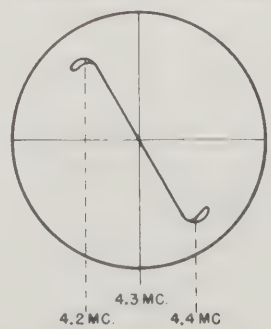
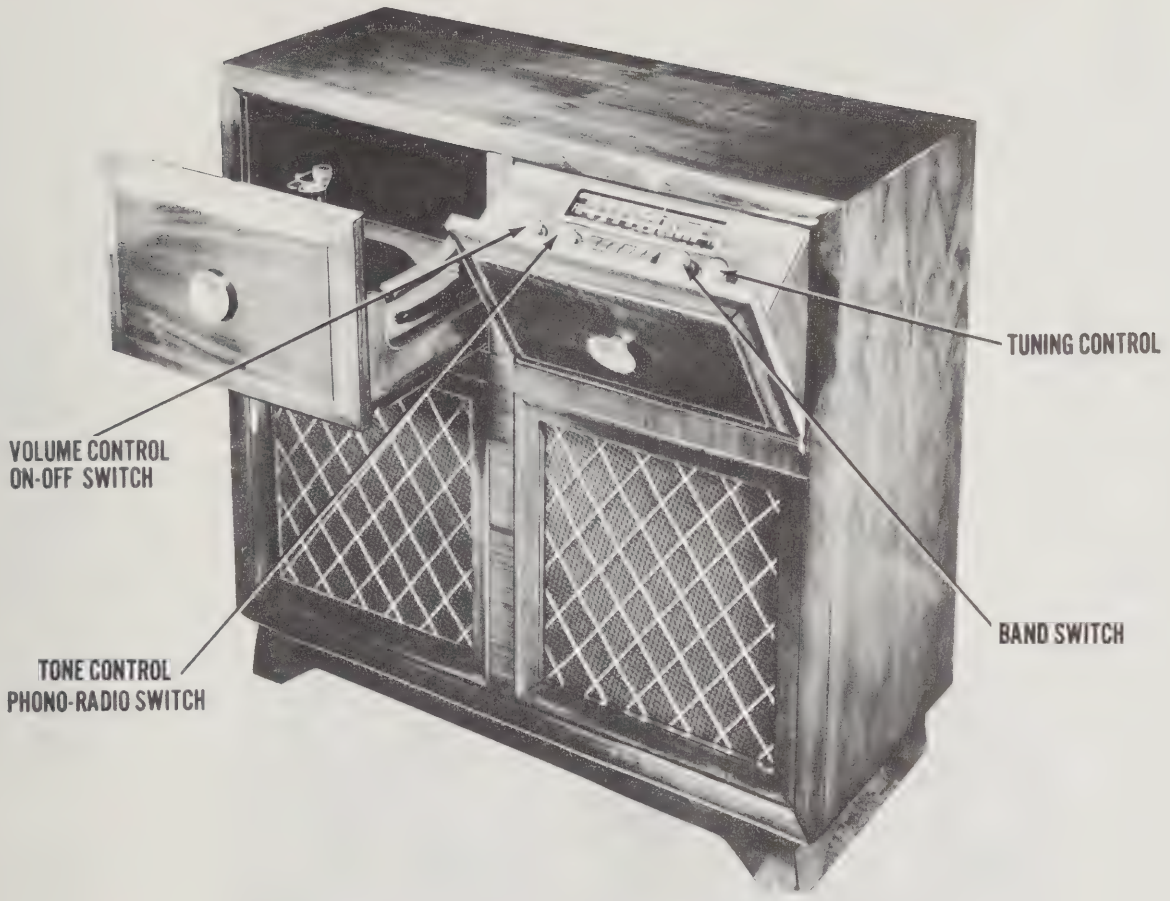


FIG. 1

MOTOROLA MODELS 107F31,
107F31B (Ch. HS-87)



MOTOROLA MODELS 107F31,
107F31B (Ch. HS-87) PAGE 1

MOTOROLA MODEL 107F31

TRADE NAME	Motorola, Model 107F31, 107F31B (Ch. HS-87)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio Multi-Band AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (TEN)	Types, 6SK7 RF Amp., 7Q7 AM Converter, 7F8 1st-2nd FM Converter, 6SG7 IF Amp., 7W7 Driver, 6SQ7 AM-Det.-AVC-AF, 6AL5 FM Det.-AVC, (2) 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC RATING .78 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1620KC SHORT WAVE 5.5-12.2MC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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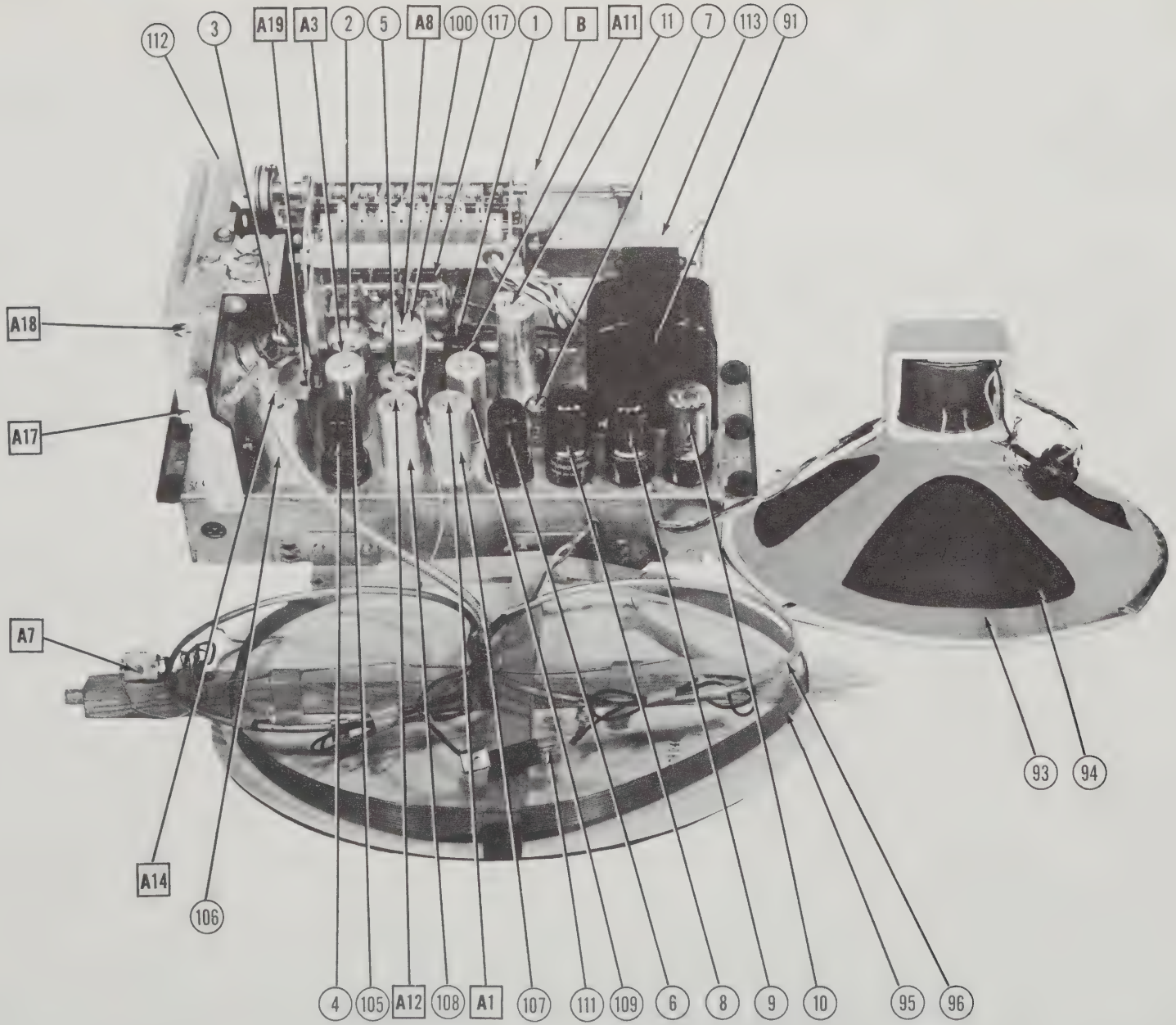
DATE 2/48 SET #33 FOLDER #483-14

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7	6SK7	8N	
2	AM Converter	7Q7	7Q7	8AL	
3	1st & 2nd FM-Conv.	7F8	7F8	8BW	
4	IF Amp.	6SG7	6SG7	8BK	
5	Driver	7W7	7W7	8BJ	
6	AM Det.-AVC-AF	6SQ7	6SQ7	8Q	
7	FM Det.-AVC	6AL5	6AL5	6BT	
8	Power Output	6V6GT	6V6GT	7AC	
9	" "	6V6GT	6V6GT	7AC	
10	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
11A	30	350	23A27718	DY-311	EL-23	AF64K4A	UP6BJ37	■ Filter
B	30	300			TA-25			▲ "
C	20	25					BR202A	Bias Filter
12	10	100	23K77635	M-10-150	UT-121	PRS150-12	BR1215	Stabilizing Cap.
13	10	100	23K77635	M-10-150	UT-121	PRS150-12	BR1215	AF Cathode Bypass
14	.002	400		S-6-002	TC-22	484-002	DT6D2	Output Plate Bypass
15	.002	400		S-6-002	TC-22	484-002	DT6D2	" " "
16	.01	600	8S9809	S-6-01	TC-11	684-01	DT6S1	Audio Coupling
17	.01	600	8S9809	S-6-01	TC-11	684-01	DT6S1	" "
18	.01	400	8S9809	S-4-01	TC-11	484-01	DT4S1	Tone Comp.
19	.005	600	8S9813	S-6-005	TC-25	684-005	DT6D5	" "
20	.1	400	8S9807	S-4-.1	TC-1	484-.1	DT4P1	AF Plate Decoupling*
21	.002	400		S-4-002	TC-22	484-002	DT6D2	Audio Coupling
22	.05	400	8S9816	S-4-05	TC-15	484-05	DT4S5	RF Bypass Pwr. Supply
23	.05	400	8S9816	S-4-05	TC-15	484-05	DT4S5	" " " "
24	.05	400	8S9816	S-4-05	TC-15	484-05	DT4S5	Driver Screen Bypass
25	.01	100	8S9801	S-4-01	TC-11	484-01	DT2S1	AVC Filter
26	.01	400	8S9809	S-4-01	TC-11	484-01	DT4S1	IF Amp. Plate Decoup.
27	.05	400	8S9816	S-4-05	TC-15	484-05	DT4S5	IF Amp. Screen Bypass
28	.05	100	8S9801	S-4-01	TC-15	484-05	DT2S5	AVC Filter
29	.05	400	8S9816	S-4-05	TC-15	484-05	DT4S5	FM Conv. Plate Decoup.
30	.05	400	8S9816	S-4-05	TC-15	484-05	DT4S5	AM Conv. Screen Byp.
31	.05	400	8S9816	S-4-05	TC-15	484-05	DT4S5	RF Amp. Screen Bypass
32	.01	400	8S9809	S-4-01	TC-11	484-01	DT4S1	AVC Filter
33	.1	200	8S9806	S-2-1	TC-1	484-.1	DT2P1	Motor Filter
34	100		21R6641	MO.5-31	1FM-31	1468-0001	5W5T1	AF Plate Bypass
35	1000		21R2724	MW.5-21	1FM-21	1467-001	1W5D1	Diode Load Cap.
36	1000		21R2724	MW.5-21	1FM-21	1467-001	1W5D1	" " "
37	250		21R6648	MO.5-325	1FM-325	1468-00025	5W5T25	Tone Comp.
38	100		21R6641	MO.5-325	1FM-31	1468-0001	5W5T1	RF Bypass
39	500		21R2730	MO.5-35	1FM-35	1468-0005	5W5T5	De-emphasis
40	1000		21R2724	MW.5-21	1FM-21	1467-001	1W5D1	De-emphasis
41	150			MO.5-315	1FM-315	1468-00015	5W5T15	Diode RF Filter
42	150			MO.5-315	1FM-315	1468-00015	5W5T15	Diode RF Filter
43	500		21R2730	MOS.5-35	MS-35	1469-0005	5R5T5	RF Coupling
44	250		21R2729	MOS.5-325	MS-325	1469-00025	5R5T25	FM Osc. Coupling
45	16		21A76320					Fixed Trimmer-Cer.
46	250		21A112247	MO.5-325	1FM-325	1468-00025	5W5T25	Fixed Pad
47	250		21A112247	MO.5-325	1FM-325	1468-00025	5W5T25	Filament Bypass
48	50		21R6642	MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.
49	.68							RF Coupling-Cer.
50	50		21R6642	MO.5-45	1FM-45	1468-00005	5W5Q5	" "
51	1000		21R2724	MW.5-21	1FM-21	1467-001	1W5D1	AVC Filter
119	.01	400	8S9809	S-4-01	TC-11	484-01	DT4S1	Decoupling*

*Not used in all models.

DATE 2/43 SET #33 FOLDER #455-14

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
52A	1 Meg.	½	18K74891-B	D13-137X	AT-109	Volume Control tapped @ 250KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 52A per instructions
C	Switch		" "	41	SW-A	" " " " "
53	1 Meg.	½	18A28062-C			Tone Control & Radio-Phono Sw.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
54	10 Meg.	½	6R2109	BTS-10 Meg.	Br.-Blk.-Blue FM Converter Grid
55	15KΩ	1	6R6013	BTA-15K	Br.-Grn.-Or. FM Converter Plate Load
56	1.5 Meg.	½	6R6013	BTS-1.5 Meg.	Br.-Grn.-Grn. FM Converter Grid
57	15KΩ	½	6R6477	BTS-15K	Br.-Grn.-Or. FM Converter Plate Decoupling
58	22KΩ	1	6R6313	BTA-22K	Red-Red-Or. Voltage Dropping
59	33KΩ	½	6R6410	BTS-33K	Or.-Or.-Or. Bleeder
60	220KΩ	½	6R6015	BTS-220K	Red-Red-Yl. AVC Network
61	39KΩ	1	6R5588	BTA-39K	Or.-White-Or. 1st IF Screen Dropping
62	1000Ω	½	6R6301	BTS-1000	Br.-Blk.-Red 1st IF Plate Decoupling
63	47KΩ	½	6R6056	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
64	150KΩ	½	6R6398	BTS-150K	Br.-Grn.-Yl. 2nd IF Transformer Shunt
65	330Ω	½		BW-½-330	Or.-Or.-Br. Balancing Resistor
66	22KΩ	½	6R6397	BTS-22K	Red-Red-Or. De-emphasis
67	330KΩ	½		BTS-330K	Or.-Or.-Yl. Diode Load
68	10KΩ	½	6R6320	BTS-10K	Br.-Blk.-Or. Ratio Detector Diode Load
69	10KΩ	½	6R6320	BTS-10K	Br.-Blk.-Or. Ratio Detector Diode Load
70	47KΩ	½	6R6056	BTS-47K	Yl.-Vi.-Or. AVC Network
71	220KΩ	½	6R6015	BTS-220K	Red-Red-Yl. AVC Network
72	220Ω	½		BW-½-220	Red-Red-Br. AM Converter Cathode
73	220KΩ	½	6R6015	BTS-220K	Red-Red-Yl. AVC Network
74	470KΩ	½	6R6032	BTS-470K	Yl.-Vi.-Yl. AM RF Grid
75	22KΩ	1	6R6313	BTA-22K	Red-Red-Or. AM RF Screen Dropping
76	12KΩ	3	6R5087		Br.-Red-Or. Screen Dropping
77	22KΩ	½	6R6028	BTS-22K	Red-Red-Or. AM Oscillator Grid
78	1 Meg.	½	6R6004	BTS-1 Meg.	Br.-Blk.-Grn. Series Phono
79	330KΩ	½		BTS-330K	Or.-Or.-Yl. Phono Shunt
80	150Ω	2		BW-2-150	Br.-Grn.-Br. Bias
81	33Ω	1		BW-1-33	Or.-Or.-Blk. "
82	33KΩ	½	6R6410	BTS-33K	Or.-Or.-Yl. Tone Compensation
83	1500Ω	½		BTS-1500	Br.-Grn.-Red AF Cathode
84	68KΩ	½	6R6000	BTS-68K	Blue-Gray-Or. AF Plate Load-See Note 3
85	100KΩ	½	6R6075	BTS-100K	Br.-Blk.-Yl. AF Plate Decoupling - See Note 1
86	680KΩ	½		BTS-680K	Blue-Gray-Yl. AVC Network-See Note 2
87	470KΩ	½	6R6032	BTS-470K	Yl.-Vi.-Yl. Output Grid
88	470KΩ	½	6R6032	BTS-470K	Yl.-Vi.-Yl. " "
89	300Ω	1		BW-1-330	Or.-Or.-Br. Output Plate Load
90	2.7Ω	½	17K77634	BW-½-2.7	Red-Vi.-Gold Series Pilot Light-See Note 1
118	1000Ω	½	6R6301	BTS-1000	Br.-Blk.-Red Decoupling-See Note 1

Note 1-Not used in all models.
Note 2-Some models use 2.2 Meg. in this application. IRC replacement BTS-2.2 Meg.
Note 3-Some models use 100K in this application. IRC replacement BTS-100K.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
91	117V AC @ .78A	640V CT @ .093A	5.2V AC @ 1.8A	25V AC @ 5.0A tapped @ 6.4V AC @ 3.0A.	25C75489			

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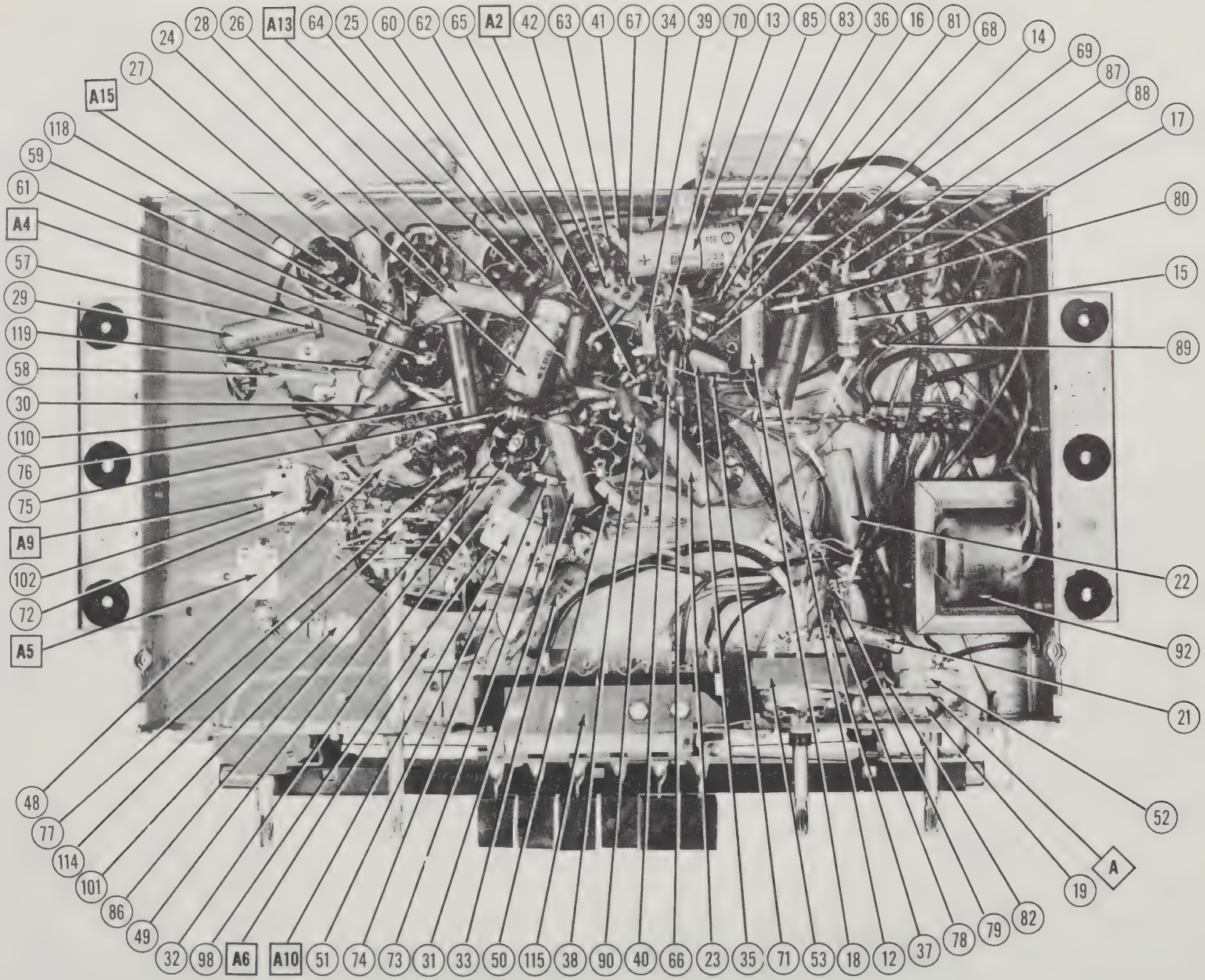
CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MOTOROLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
92	1900Ω & 1900Ω	3.9Ω	260Ω & 360Ω	.4Ω	25B77709				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MOTOROLA PART No.	JENSEN PART No.		
	FIELD RES.	VC IMP.				
93	800Ω	3.9Ω	50C77716			
	CONE DIA.	VC DIA.				
94	11½"	1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	
95	BC Loop Ant.	.1Ω	1.5Ω	24K76103		
96	FM " "		0Ω	1X76326		
97	SW Ant.					
98	SW Ant.Coil	2.5Ω	0Ω	24A74822	14-1044	
99	FM " "		0Ω	24C75492		Items 99, 103, 104 are slug tuned, ganged and part of FM tuning assy.E-34-T
100	BC RF Coil	170Ω	4.5Ω			
101	BC Osc.Coil		5.8Ω	24A74821	14-1040	
102	SW " "		0Ω	24A74820	14-1046	
103	FM " "		0Ω	24K75496		
104	FM Var. IF		0Ω	24K75494		
105	Input IF AM	11Ω	12.5Ω	24B75487†		
106	Input IF FM	2Ω	2.2Ω	24B75481†		
107	Output IF AM	14Ω	14Ω	24B70537†		†Does not include shield.
108	Output IF FM	.8Ω	.8Ω	24B75473†		
109	Disc. Trans.	2.3Ω	3Ω	24B75456†		
110	Fil. Choke		.1Ω	24A74939		

DIAL LIGHT

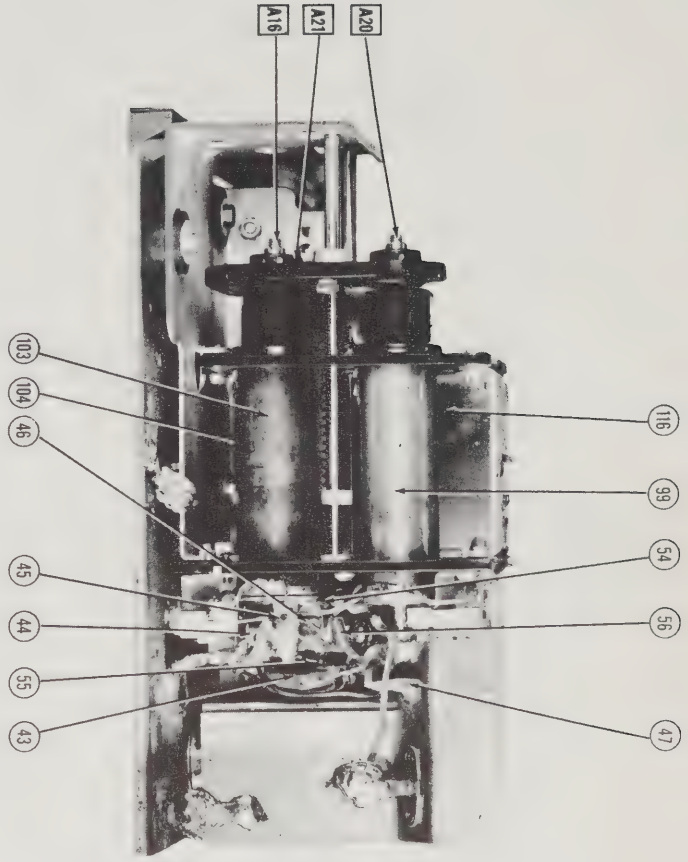
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MOTOROLA PART No.		
111-113	Bayonet	6-8	0.15	Brown	65X11854		Type 47

MISCELLANEOUS

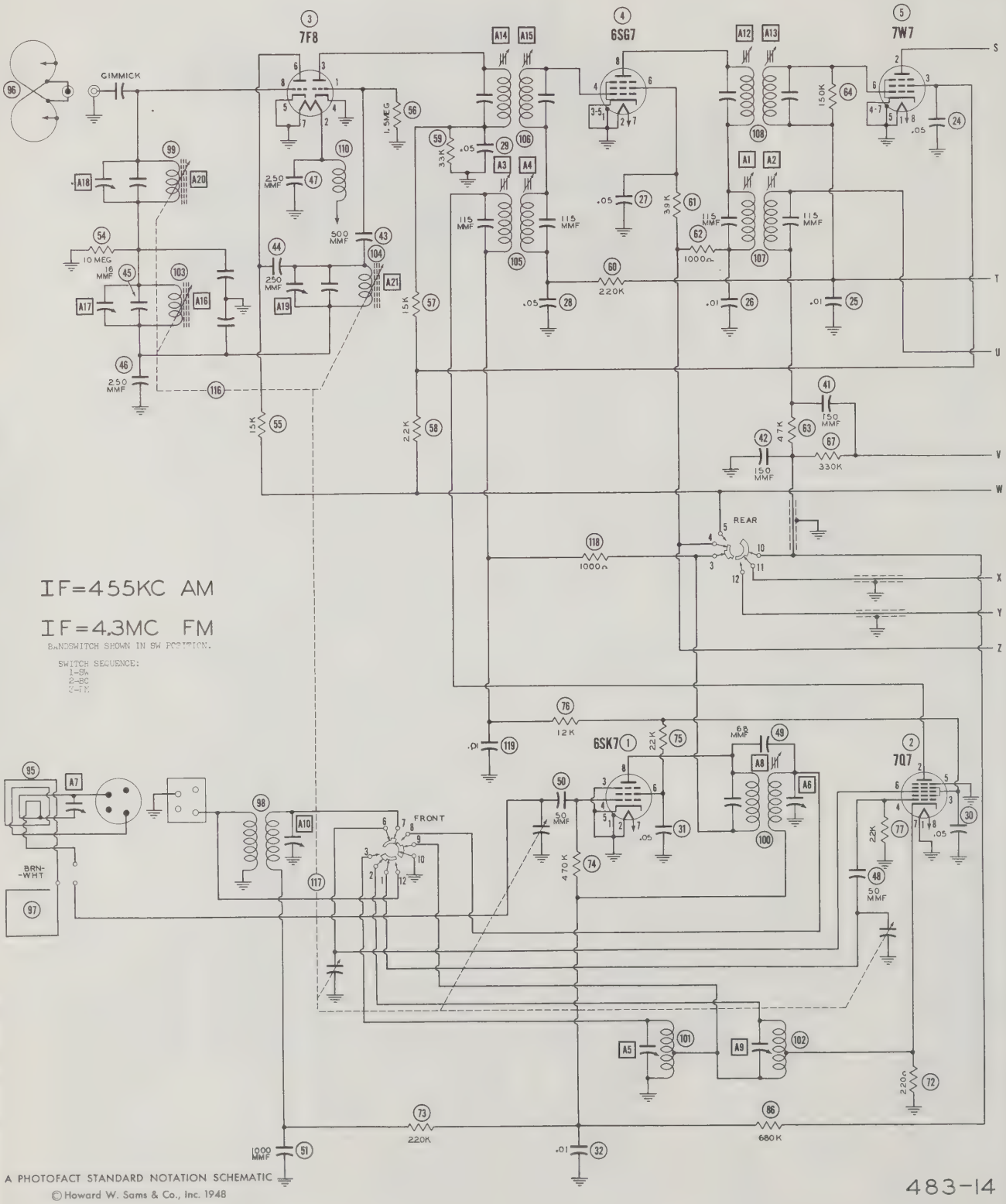
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
114	Switch		Band
115	Pushbutton Assby	1X75820	
116	FM Tuning Assby.	E-34-T	
117	2 Gang Var. Cap.	Part of E-34-T	(20-527MMF, 20-527MMF, 15-242MMF)

PUSHBUTTON ADJUSTMENTS

1. Turn receiver on and allow it to warm up for about 15 minutes.
2. Make a list of desired stations to be tuned automatically, AM or FM.
3. Loosen tuner locking screw B all the way, identified in photo on page 2.
4. Turn band switch to correct band and carefully tune in first desired station. Hold tuning control knob and depress pushbutton, holding it in until mechanism stops.
5. Follow same procedure as given in Step 4 for setting remaining buttons.
6. After all buttons are set tighten locking screw B1 firmly.



DATE 2/48 SET #32 FOLDER #--14



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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A RIDER RIDOTFACT STANDARD NOTATION SCHEMATIC
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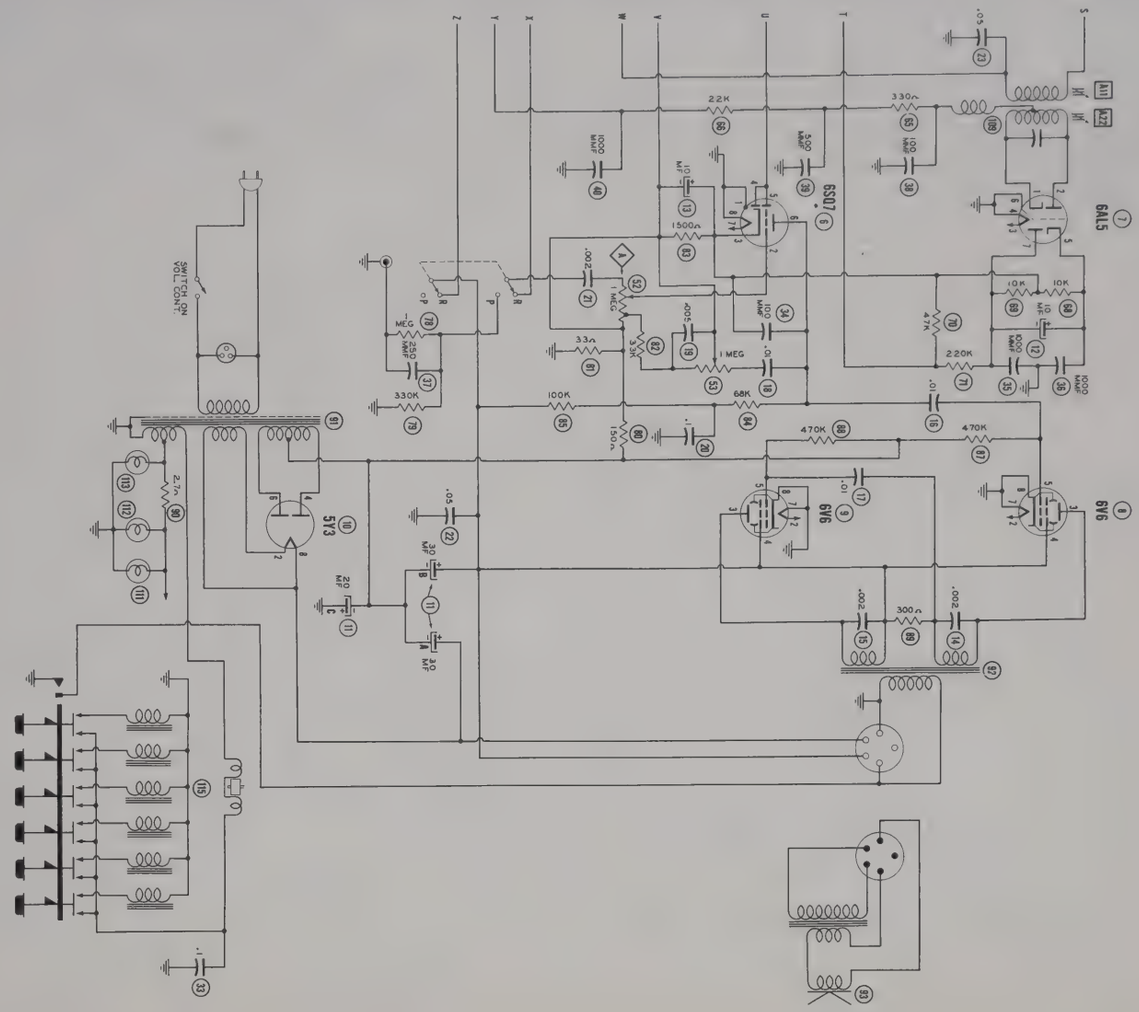


VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V.	0V.	0V.	-.6VDC	0V.	57VDC	6.4VAC	235VDC
2	7Q7	0V.	235VDC	90VDC	-8.5VDC§	0V.	-.5VDC	0V.	6.4VAC
‡ 3	7F8	-1VDC§	6.4VAC	60VDC	0V.	0V.	165VDC	0V.	-.05VDC
4	6SG7	0V.	0V.	0V.	-.8VDC	0V.	120VDC	6.4VAC	227VDC
‡ 5	7W7	0V.	235VDC	110VDC	0V.	0V.	-1.2VDC	0V.	6.4VAC
6	6SQ7	0V.	-1.3VDC	-1.4VDC	-1.8VDC	-1.8VDC	155VDC	6.4VAC	0V.
‡ 7	6AL5	-1.4VDC	-1.4VDC	6.4VAC	0V.	-1.2VDC	0V.	-1.7VDC	-
8	6V6GT	-2.6VDC	6.4VAC	220VDC	235VDC	-10VDC	-15VDC	0V.	0V.
9	6V6GT	0V.	6.4VAC	220VDC	235VDC	-10VDC	220VDC	0V.	0V.
10	5Y3GT	0V.	300VDC	0V.	320VAC	0V.	320VAC	0V.	300VDC

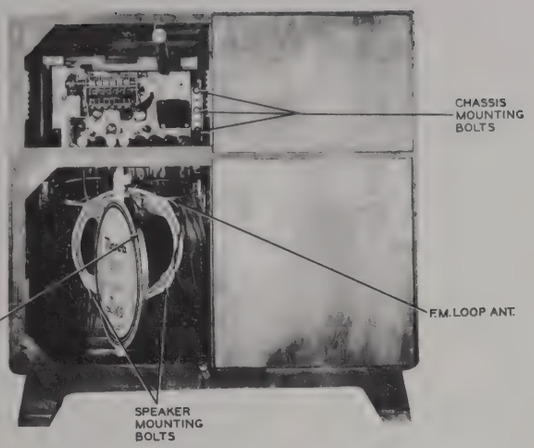
RESISTANCE READINGS

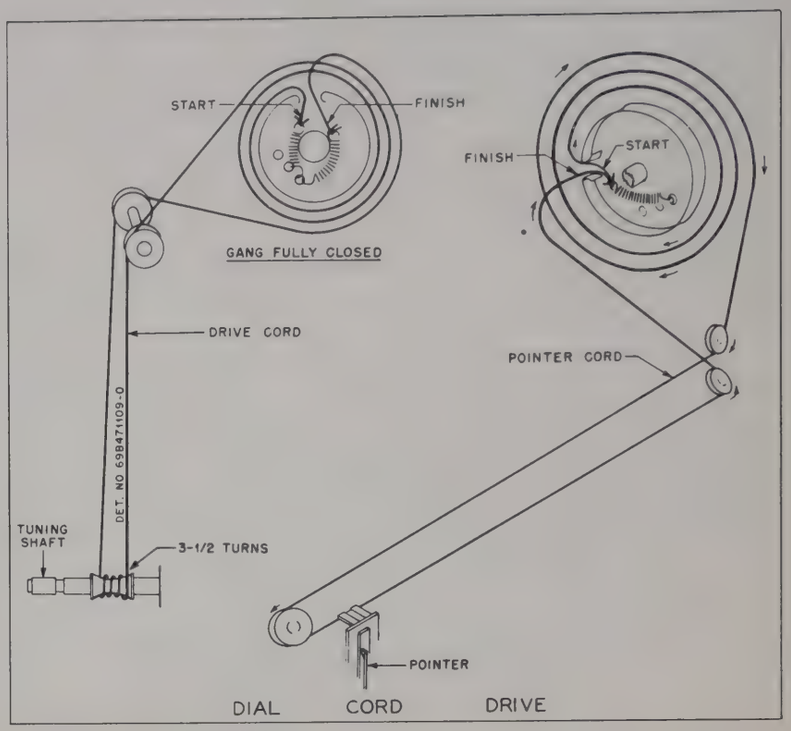
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0Ω	0Ω	0Ω	1.5 Meg.	0Ω	80KΩ	.1Ω	50KΩ
2	7Q7	0Ω	50KΩ	62KΩ	22KΩ	0Ω	1 Meg.	1Ω	.1Ω
‡ 3	7F8	1.5 Meg.	.2Ω	30KΩ	0Ω	0Ω	65KΩ	0Ω	10 Meg.
4	6SG7	0Ω	0Ω	0Ω	280KΩ	0Ω	90KΩ	.1Ω	60KΩ
‡ 5	7W7	0Ω	50KΩ	40KΩ	0Ω	0Ω	38KΩ	0Ω	.1Ω
6	6SQ7	0Ω	1 Meg.	1.5KΩ	400KΩ	400KΩ	150KΩ	.1Ω	0Ω
‡ 7	6AL5	INF.	INF.	.1Ω	0Ω	11KΩ	0Ω	11KΩ	-
8	6V6GT	32Ω	.1Ω	50KΩ	50KΩ	500KΩ	200Ω	0Ω	0Ω
9	6V6GT	INF.	.1Ω	50KΩ	50KΩ	500KΩ	50KΩ	0Ω	0Ω
10	5Y3GT	0Ω	50KΩ	0Ω	250Ω	0Ω	260Ω	0Ω	50KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.





DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove loop antenna plug from chassis.
3. Lift up on top spring clamp and remove loop from cabinet.
4. Remove FM antenna plug from chassis.
5. Remove four hex head screws holding FM antenna in cabinet. Remove FM antenna from cabinet.
6. Remove speaker plug from speaker.
7. Disconnect phono-pickup plug from under record changer.
8. Disconnect phono-motor plug from under record changer.
9. Remove eight hex head screws holding chassis in cabinet. Remove chassis from cabinet.
10. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

Use a 30% amplitude modulated signal throughout entire alignment.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) 7Q7. Low side to chassis.	455KC	BC (1st position clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2	.1 MFD.	"	1400KC	"	1400KC	"	A5	" " " "
3		Loop	"	"	Tune for max-imum output.	"	A6,A7	Fashion loop of several turns of wire and radiate signal into loop of re-ceiver. Adjust for maxi-mum output.
4		"	600KC	"	"	"	A8	Rock tuning cap. and ad-just for maximum output.
5	.1 MFD.	High side to Pin 4 (grid) 7Q7. Low side to chassis.	11.5MC	SW (fully counter-clock-wise)	11.5MC	"	A9	Adjust for maximum output. Check for image by tuning sig. gen. to approx. 12.4MC. If signal is not heard retune sig. gen. to 11.5MC and loosen trimmer until next peak is obtained. Adjust for maximum output and re-check for image.
6	50MMFD.	High side to ext. ant. lead. Low side to chassis.	"	"	Tune for max-imum output.	"	A10	Disconnect BC loop. Rock tuning cap. and adjust for maximum output.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND OUTPUT METER

Use 30% amplitude modulated signal throughout entire alignment.

Once the discriminator secondary has been aligned (A22) no further adjustments of the FM circuits should be made with an AM signal.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7	.001 MFD	High side to Pin 1 (grid) 7F8. Low side to chassis.	4.3MC (amplitude modulated)	FM (fully clock-wise)	112MC	Across voice coil	A11,A12, A13,A14, A15	Turn A22 out completely. Then adjust A11, A12, A13 A14 and A15 for maximum output.
8	DIRECT	Remove FM loop. Signal gen. across FM loop re-ceptacle.		"	"	"	A16	Set spacing between end of core and bakelite piece to which it is mounted to 1/32" by turning core slotted nut.
9	DIRECT	"	90MC	"	90MC	"	A17, A18, A19	Adjust for maximum output
10	DIRECT	"	105MC	"	105MC	"	A16,A20 A21	Adjust for maximum output. Repeat Steps 9 & 10 until no further improvement can be made.
11	DIRECT	"	"	"	"	"	A17,A18 A19	Adjust for maximum output.
12		Connect FM loop.	"	"	Tune for max-imum output.	"	A18	Fashion loop of several turns of wire and radiate signal into loop of re-ceiver. Adjust for maxi-mum output.
13	.001MFD	High side to Pin 1 (grid) 7F8. Low side to chassis.	4.3MC	"	112MC	"	A22	Adjust for zero output.

FM ALIGNMENT USING FM SIGNAL GENERATOR, OSCILLOSCOPE AND OUTPUT METER

Connect synchronized sweep voltage from signal generator to horizontal deflection amplifier of scope. If this voltage is not phased properly resulting in a double trace insert a 500KΩ variable resistor in series with the sync. sweep voltage terminal and horizontal amplifier terminal. Con-nect a .002 MFD cap. across horizontal amplifier terminals. Adjust variable resistor to give a single trace. (It may be necessary on some scopes to use different values of R & C to get proper pattern.)

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7	.01 MFD.	High side to Pin 6 (grid) 7W7. Low side to chassis.	4.3MC (freq. mod 60∿ 250KC sweep)	FM (fully clock-wise)	112MC	Vertical input to Point A. Ground to chassis.	A11	Turn A22 out as far as it will go. Adjust A11 to obtain pattern symmetri-cal about vertical axis per Figure 1.
8	.01 MFD.	"	"	"	"	"	A22	Adjust for symmetrical pattern of Figure 2 with maximum straightness of diagonal line and peaks occurring at about 100KC above and below 4.3MC.
9	.001MFD.	High side to Pin 4 (grid) 6SG7. Low side to chassis.	4.3MC (freq. mod. 60∿200KC sweep)	"	"	"	A12,A13	Adjust for symmetrical pattern of previous step with peaks occuring at a slightly lower deviation.
10	.001MFD	High side to Pin 1 (grid) 7F8. Low side to chassis.	"	"	"	"	A14,A15	Adjust for symmetrical pattern substantially linear between peaks.
						OUTPUT METER		
11		Disconnect FM Loop.		"	"	Across voice coil	A16	Set spacing between end of osc. core and bakelite piece to which it is mounted to 1/32" by turning tuning core slotted nut.
12	DIRECT	Across FM loop receptacle.	90MC (30% freq. mod. at 400∿).	"	90MC	"	A17, A18,A19	Adjust for maximum output
13	DIRECT	"	105MC (30% freq. mod. at 400∿).	"	105MC	"	A16, A20,A21	Adjust for maximum output. Repeat Steps 12 & 13 until no further improvement can be made.
14	DIRECT	"	"	"	105MC	"	A17,A18, A19	Adjust for maximum output.
15		Loop (Reconnect FM Loop to chassis)	"	"	Tune for max-imum output.	"	A18	Fashion loop of several turns of wire and radiate signal into loop of re-ceiver. Adjust for maxi-mum output.

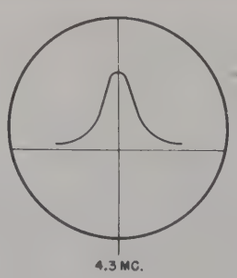


FIG. 1

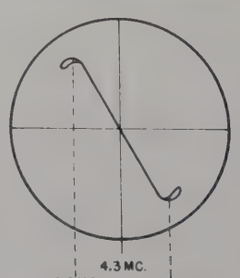
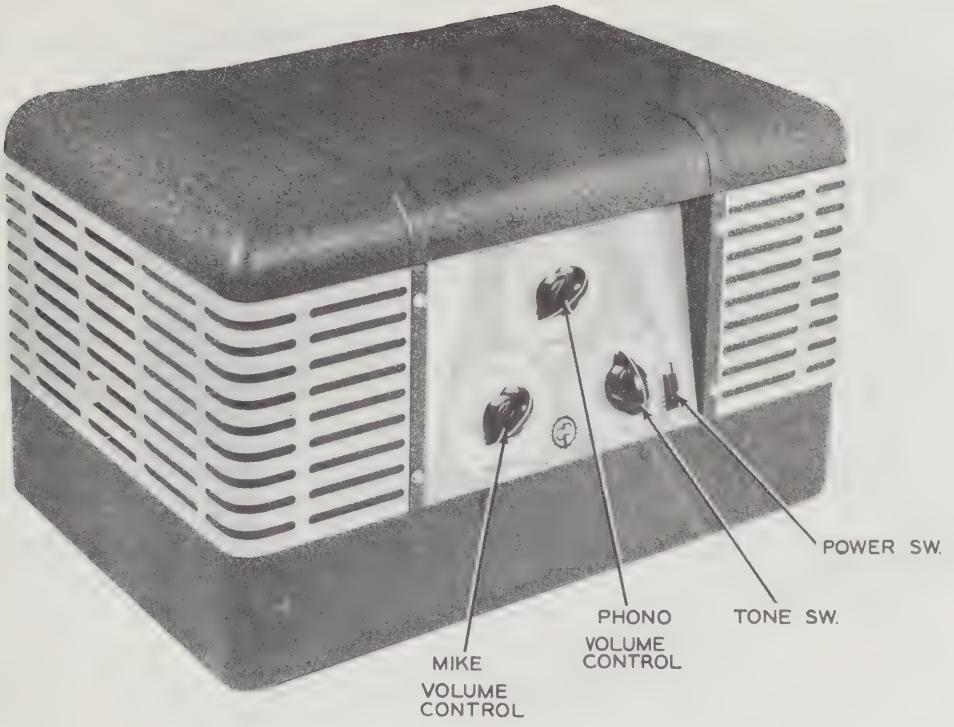


FIG. 2

OPERADIO
MODEL 1A35



OPERADIO
MODEL 1A35

OPERADIO MODEL 1A35

TRADE NAME	Operadio, Model 1A35
MANUFACTURER	Operadio Mfg. Co., St. Charles, Ill.
TYPE SET	AC Operated Two Channel Audio Amplifier
TUBES(FOUR)	Types, 6SJ7 Mic. Pre-Amp., 6SN7GT AF Amp., 6L6GA Power Output, 5Z4 Rectifier.
POWER SUPPLY	105-125 Volts AC RATING .62 Amp. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0V.	3.2VAC	0V.	-1VDC	0V.	35VDC	3.2VAC	85VDC
2	6SN7	0V.	82VDC	2VDC	0V.	65VDC	1.8VDC	3.2VAC	3.2VAC
3	6L6	0V.	3.2VAC	400VDC	265VDC	0V.	0V.	3.2VAC	18VDC
4	5Z4	0V.	420VDC	0V.	340VAC	0V.	340VAC	0V.	420VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0Ω	.05Ω	0Ω	10 Meg.	0Ω	1.6 Meg.	.05Ω	360KΩ
2	6SN7	270KΩ	140KΩ	600Ω	500KΩ#	150KΩ	560Ω	.05Ω	.05Ω
3	6L6	0Ω	.05Ω	70KΩ	82KΩ	100KΩ	INF.	.05Ω	280Ω
4	5Z4	INF.	70KΩ	INF.	120Ω	INF.	125Ω	INF.	70KΩ

#TONE SWITCH IN MUSIC POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

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DATE 2/48 SET #33 FOLDER #483-15

PARTS LIST AND DESCRIPTIONS

OPERADIO MODEL 1A35

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		OPERADIO PART No.	STANDARD REPLACEMENT		
1	Mic. Pre-Amp.	6SJ7	6SJ7	8N	
2	AF Amp.	6SN7GT	6SN7GT	8BD	
3	Power Output	6L6GA	6L6GA	7AC	
4	Rectifier	5Z4	5Z4	5L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	OPERADIO PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
5	40	500	199-2914	DY-3x20-450*†	EL-344*	AF444J*†	UP2250*	Filter
6A	20	500	199-2903	DY-3x20-450†	EL-350†	AF444J†	UP2250	▬ Filter
B	20	500						▲ "
7	20	150	199-2016206	M-20-150	UT-201	PRS150-20		Cathode Bypass
8	006	600	199-4030602	MPH-6-005	TC-20	684-006	DT6D6	Line Filter
9	0005	1000	199-4030501	S-6-005	TC-35	1467-0005	DT6T5	Tone Comp.
10	.1	400	199-4021104	S-4-1	TC-1	484-.1	DT4P1	Audio Coupling
11	.1	400	199-4021104	S-4-1	TC-1	484-.1	DT4P1	" "
12	0005	1000	199-4030501	S-6-0005	TC-35	1467-0005	DT6T5	Tone Comp.
13	00025	600	199-4031251	S-6-00025	TC-325	1468-00025	DT6T25	" "
14	00025	600	199-4031251	S-6-00025	TC-325	1468-00025	DT6T25	" "
15	.01	400	199-4021103	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
16	.1	400	199-4021104	S-4-1	TC-1	484-.1	DT4P1	AF Screen Bypass
17	006	600	199-4030602	S-6-006	TC-26	684-006	DT6D6	Mic. Coupling

*Parallel sections to obtain desired capacity.
†Omit one section.

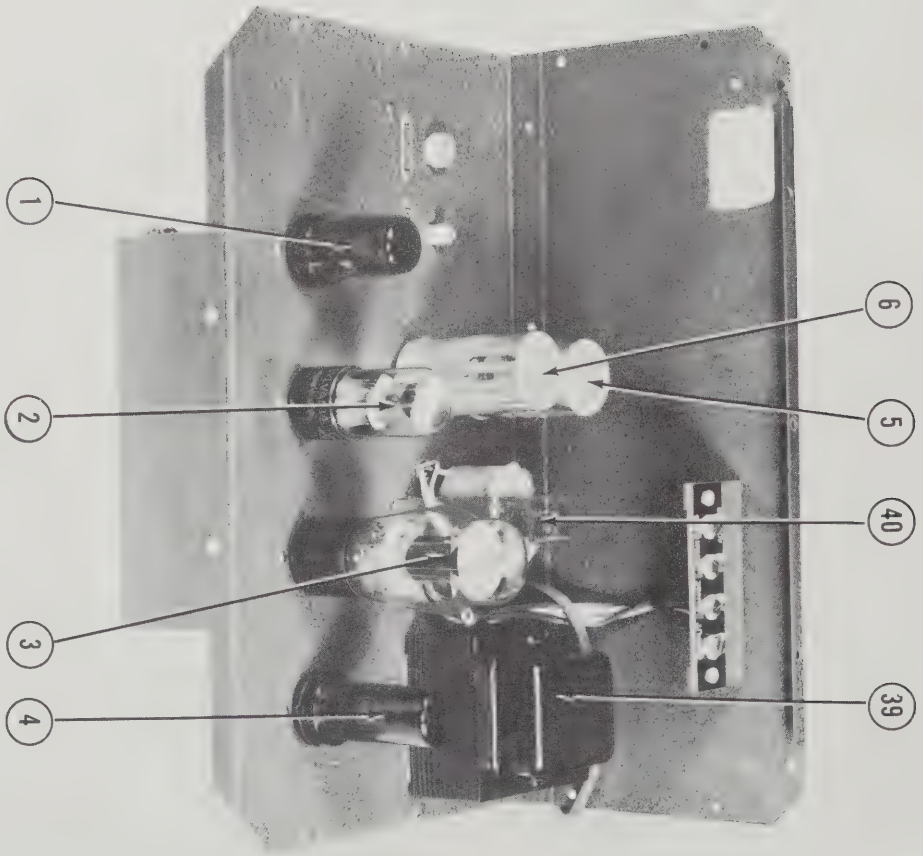
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	OPERADIO PART No.	IRC PART No.	CLAROSTAT PART No.	
18A	500KΩ	½	601-3289	D13-133	M-60-7	Mike Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 18A per instructions
19A	2.5 Meg.	½	601-3589	D13-140	M-67-Z	Phono Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 19A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	OPERADIO PART No.	IRC PART No.	
20	10 Meg.	½	600-13463	BTS-10 Meg.	Br.-Blk.-Blue Mic. Amp. Grid
21	270KΩ	1	600-0116-274	BTA-270K	Red-Vi.-Yl. Mic. Amp. Plate Load
22	1.5 Meg.	1	600-0116-155	BTA-1.5 Meg.	Br.-Grn.-Grn. Mic. Amp. Screen Dropping
23	470KΩ	1	600-0116-474	BTA-470K	Yl.-Vi.-Yl. Isolation
24	470KΩ	1	600-0116-474	BTA-470K	Yl.-Vi.-Yl. "
25	470KΩ	1	600-0116-474	BTA-470K	Yl.-Vi.-Yl. Tone Compensation
26	470KΩ	1	600-0116-474	BTA-470K	Yl.-Vi.-Yl. " "
27	1 Meg.	1	600-0116-105	BTA-1 Meg.	Br.-Blk.-Grn. 1st AF Grid
28	560Ω	1	600-0116-561	BTA-560	Grn.-Blue-Br. 1st AF Cathode
29	56KΩ	1	600-0116-563	BTA-56K	Grn.-Blue-Or. 1st AF Plate Load
30	270KΩ	1	600-0116-274	BTA-270K	Red-Vi.-Yl. 2nd AF Grid
31	56KΩ	1	600-0116-563	BTA-56K	Grn.-Blue-Or. 2nd AF Plate Load
32	560Ω	1	600-0116-561	BTA-560	Grn.-Blue-Br. 2nd AF Cathode
33	100Ω	1	600-0116-101	BW-1-100	Br.-Blk.-Br. 2nd AF Cathode
34	10KΩ	1	600-0116-103	BTA-10K	Br.-Blk.-Or. Decoupling
35	100KΩ	1	600-0116-104	BTA-100K	Br.-Blk.-Yl. Output Grid
36	300Ω	5	600-1008-301	AB-300	Output Cathode
37	12KΩ	2	600-0153-123	BT-2-12K	Br.-Red-Or. Filter
38	270Ω	1	600-0116-271	BW-1-270	Red-Vi.-Br. Feedback

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	OPERADIO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
39	117V AC @ .62A	680V CT @ .068A	5.2V AC @ 2.0A	6.4V CT @ 2.4A	710-4020	P-6120‡	T22R04‡	P-2952‡

‡Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		OPERADIO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
40	4200Ω	3-5Ω 6-8Ω 400 to 600Ω	390Ω	.3Ω .35Ω 27Ω	710-2009				

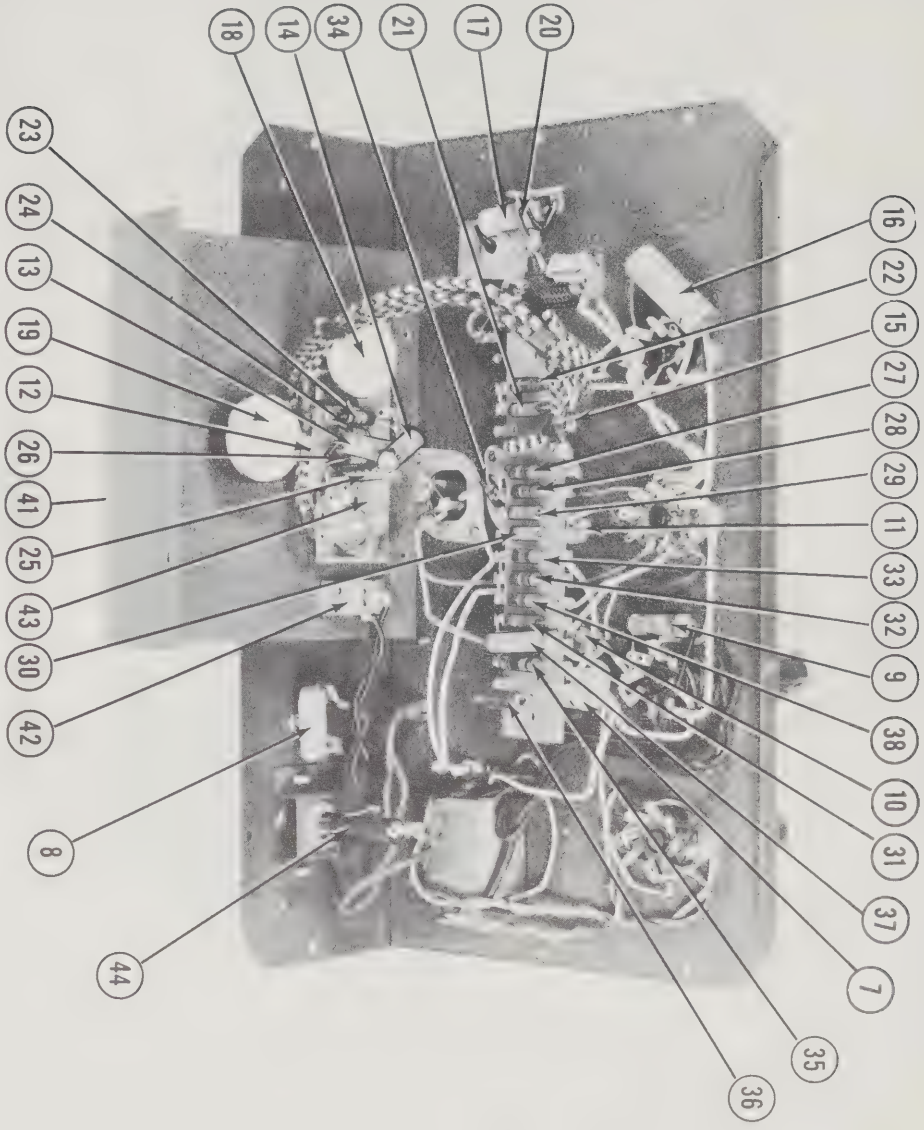
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					OPERADIO PART No.		
41	Bayonet	6-8	0.4	White			Type 55

MISCELLANEOUS

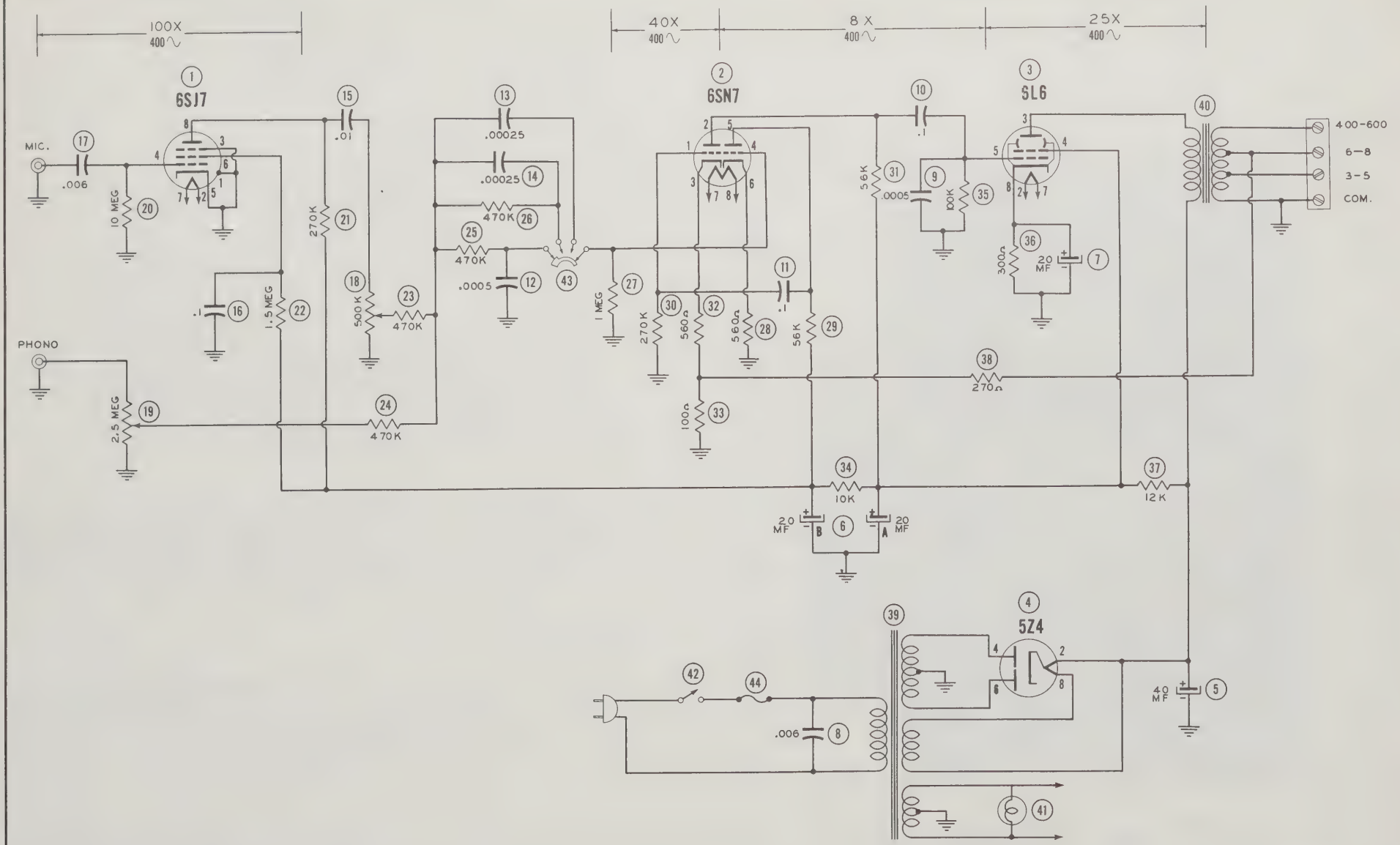
ITEM No.	PART NAME	OPERADIO PART No.	NOTES
42	Switch	680-30	On-Off (SPST)
43	"	680-9384	Tone
44	Fuse	320-835-0200	2 Amp. 3AG

CHASSIS—BOTTOM VIEW



OPERADIO MODEL 1A35

OPERADIO MODEL 1A35



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PORTO BARADIO MODELS PA-510
(Ch. 9008-A), PB-520 (Ch. 9008-B)

PORTO BARADIO MODELS PA-510
(Ch. 9008-A), PB-520 (Ch. 9008-B)

PORTO BARADIO MODEL PB-520 (Ch. 9008-B)

TRADE NAME	Porto Baradio Models PA-510 (Ch. 9008-A), PB-520 (Ch. 9008-B)
SUPPLIER	Porto Products, 412 N. Orleans St., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1780KC RATING .24 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Remove loop and chassis from cabinet. Reconnect both leads. Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
200MMFD	High side to rear stator of tuning cap. Low side to chassis.	455KC	Any point of non-interference.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output in order given and repeat.
200MMFD	High side to ext. ant. lead. Low side to chassis.	1500KC	1500KC	"	A5	Adjust for maximum output.
200MMFD	"	"	Tune for maximum output.	"	A6	" " " "

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DATE 2/48 SET #33 FOLDER #483-16

PARTS LIST AND DESCRIPTIONS

PORTO BARADIO MODELS PA-510 (Ch. 9008-A) PB-520 (Ch. 9008-2)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PORTO-BARADIO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PORTO-BARADIO PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	500256	DY-4020-150	EL-24	AF34D4A*	UP4215	■ Filter
B	20	150						▲ "
7	05	400	502157	MPH-4-05	TC-15	484-05	DT4S5	Line Filter
8	01	600	502261	S-6-01	TC-11	684-01	DT6S1	Output Plate Bypass
9	01	600	502261	S-6-01	TC-11	684-01	DT6S1	Audio Coupling
10	002	600	502260	S-6-002	TC-22	684-002	DT6D2	" "
11	05	400	502157	S-4-05	TC-15	484-05	DT4S5	AVC Filter
12	260	500	502271	MO.5-325	1FM-325	1468-00025	5W5T25	AF Plate Bypass
13	260	500	502271	MO.5-325	1FM-325	1468-00025	5W5T25	Diode RF Filter
14	50	500	502159	MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.

*Do not use bypass section.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PORTO-BARADIO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
15A	1 Meg.	½	500223	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 15A per instructions
C	Switch		" "	41	SW-A	" " " " "

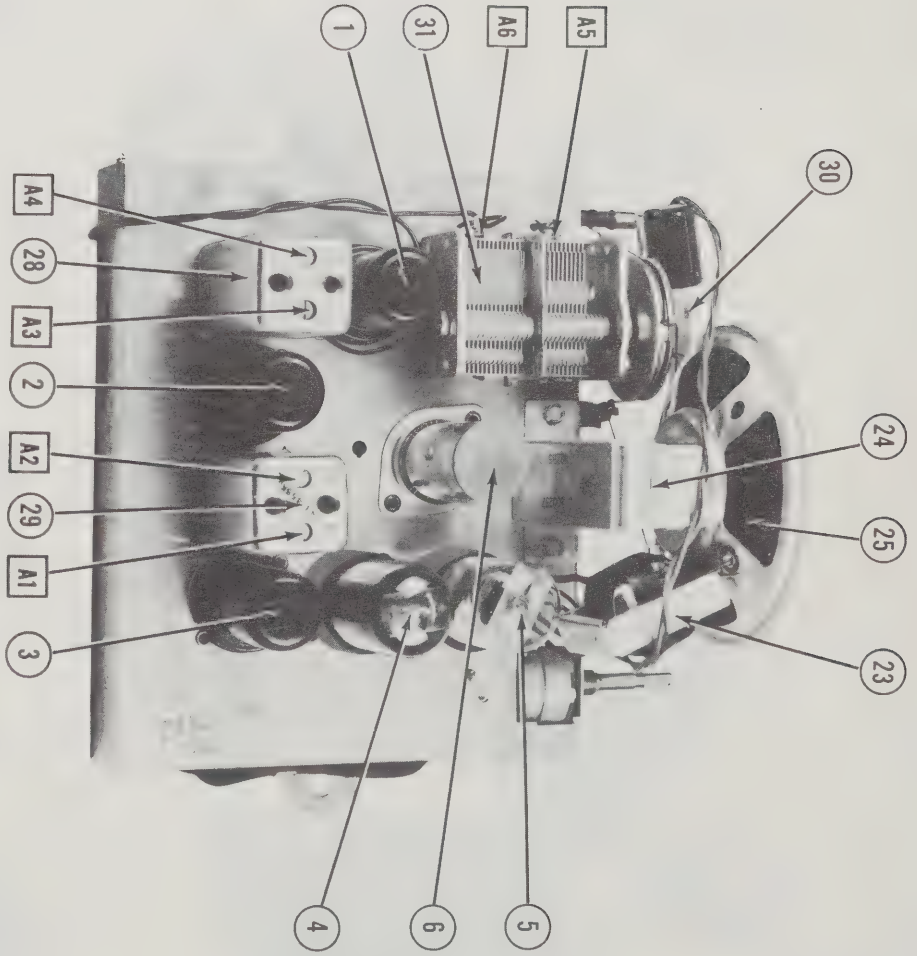
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PORTO-BARADIO PART No.	IRC PART No.	IDENTIFICATION CODES
16	22KΩ	¼	502130	BTS-22K	Red-Red-Or. Oscillator Grid
17	2.2 Meg.	¼	502135	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
18	10 Meg.	¼	502136	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
19	220KΩ	¼	502133	BTS-220K	Red-Red-Yl. AF Plate Load
20	470KΩ	¼	502134	BTS-470K	Yl.-Vi.-Yl. Output Grid
21	150Ω	1	502270	BW-1-150	Br.-Grn.-Br. Output Cathode
22	2000Ω	1	502265	BTA-2200	Red-Blk.-Red Filter

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PORTO-BARADIO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
23	2100Ω	3.2Ω	235Ω tapped @ 11Ω	.7Ω	500360	A-3576‡		A-2928‡	‡Drill new mounting holes and mount on chassis. Add extra filter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: PORTO-BARADIO PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-113†		†Fabricate new mounting bracket.
24	PM	3.2Ω	500257	Mod. P4-X		
	CONE DIA.	VC DIA.				
25	4"	1/2"	500361			

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: PORTO-BARADIO PART No.	MEISSNER PART No.	
26	Loop Ant.		.8Ω	500288		
27	Osc. Coil		5.1Ω	502285	14-1040	Tapped .8Ω
28	Input IF	21.3Ω	21.3Ω	502284	16-6666	
29	Output IF	21.5Ω	21.5Ω	502283	16-6667	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: PORTO-BARADIO PART No.		INSTALLATION NOTES
30	Bayonet	6-8	0.15	Brown	118921		Type 47

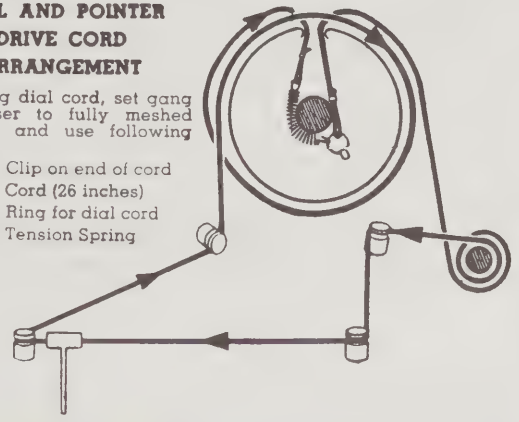
MISCELLANEOUS

ITEM No.	PART NAME	PORTO-BARADIO PART No.	NOTES
31	2 Gang Var. Cap.	500225	(27-498MMF, 30-190MMF)
	Dial Scale	500258	
	Dial Pointer	500218	

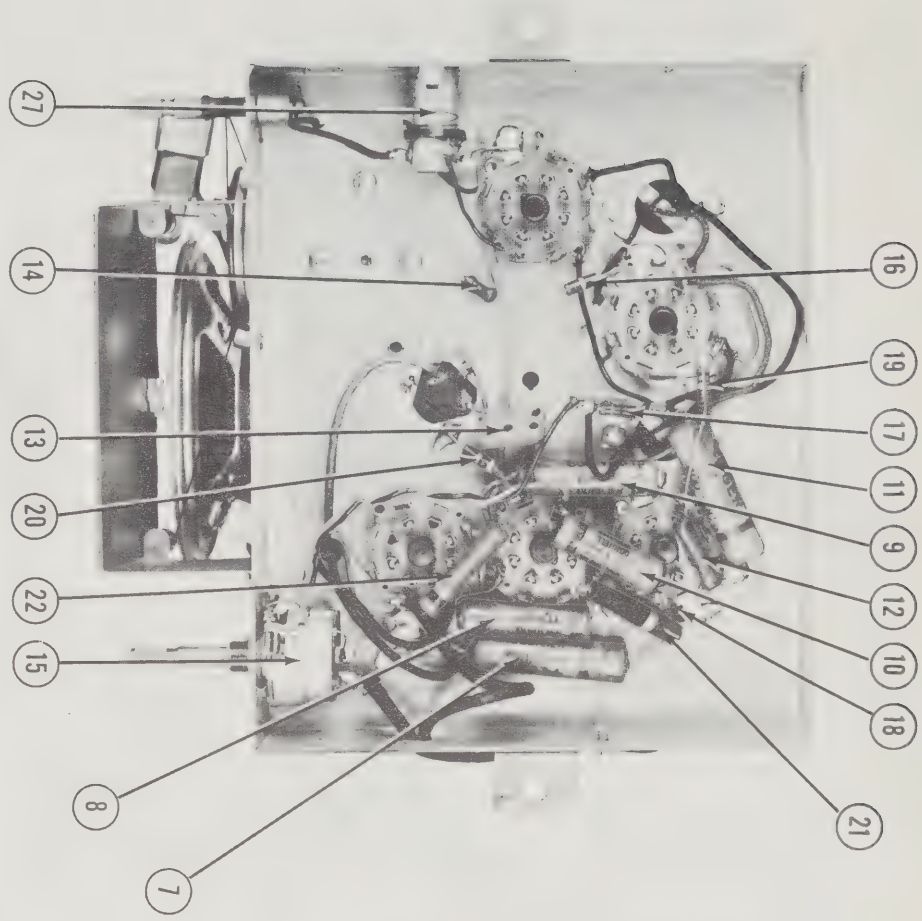
DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

114955 Clip on end of cord
117057 Cord (26 inches)
119087 Ring for dial cord
161284 Tension Spring

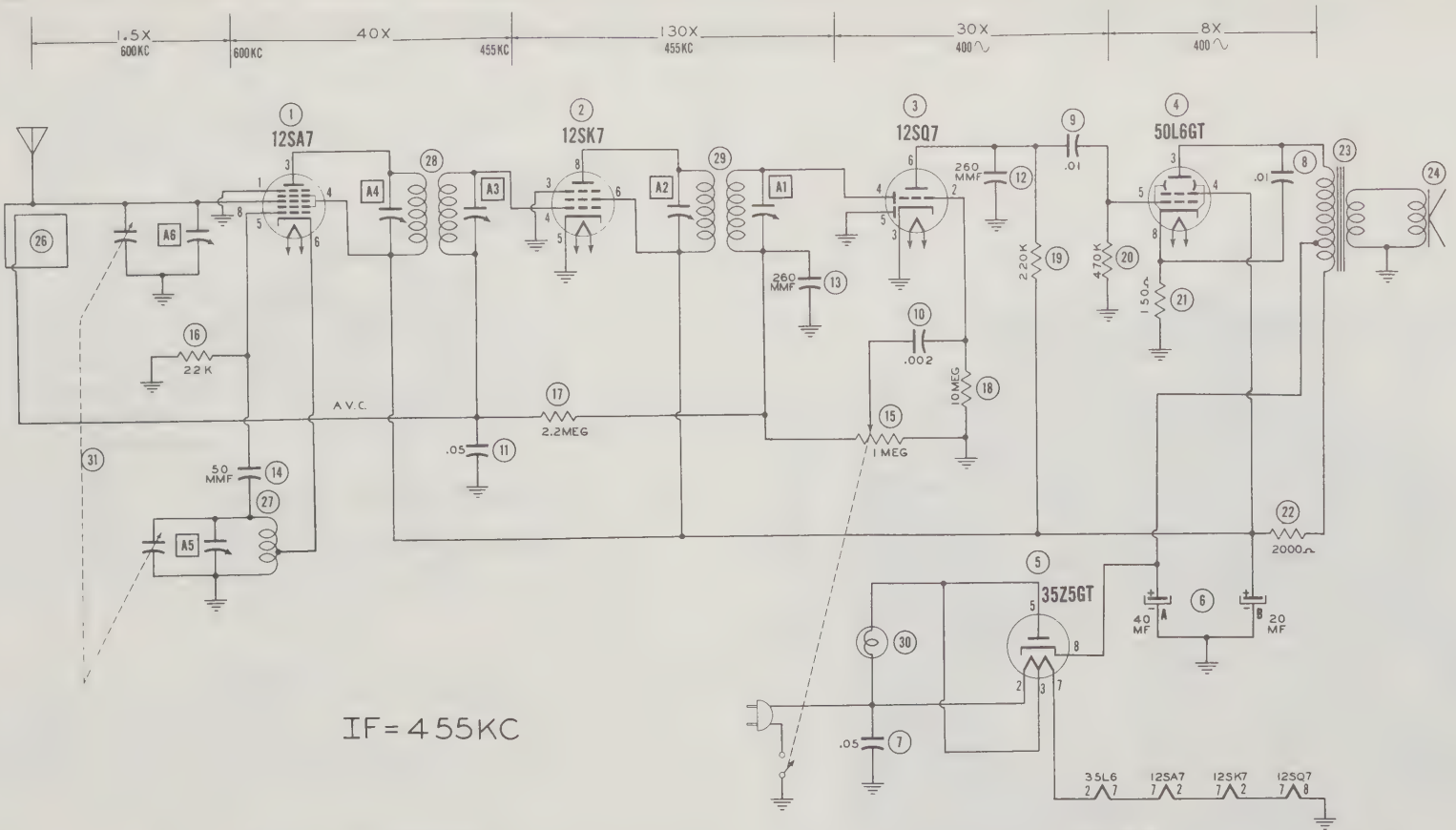


CHASSIS—BOTTOM VIEW



PORTO BARADIO MODELS PA-510 (Ch. 9008-A), PB-520 (Ch. 9008-B)

PORTO BARADIO MODELS PA-510 (Ch. 9008-A), PB-520 (Ch. 9008-B)



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	25VAC	80VDC	80VDC	-14VDC§	0V.	37.5VAC	-.6VAC
2	12SK7	0V.	25VAC	80VDC	0V.	-.5VDC	0V.	85VDC	80VDC
3	12SQ7	0V.	-.6VDC	0V.	-.5VDC	0V.	55VDC	12VAC	0V.
4	50L6GT	0V.	37VAC	117VDC	80VDC	0V.	-.5VDC	37.5VAC	8.5VDC
5	35Z5GT	125VDC	117VAC	114VAC	0V.	114VAC	0V.	87VAC	125VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0Ω	25Ω	200KΩ	200KΩ	22KΩ	1Ω	37Ω	3 Meg.
2	12SK7	0Ω	135Ω	200KΩ	3 Meg.	0Ω	200KΩ	25Ω	200KΩ
3	12SQ7	0Ω	10 Meg.	0Ω	900KΩ	0Ω	420KΩ	13Ω	0Ω
4	50L6GT	INF.	200Ω	200KΩ	200KΩ	200KΩ	200KΩ	37Ω	150Ω
5	35Z5GT	200KΩ	119Ω	115Ω	INF.	115Ω	INF.	3Ω	200KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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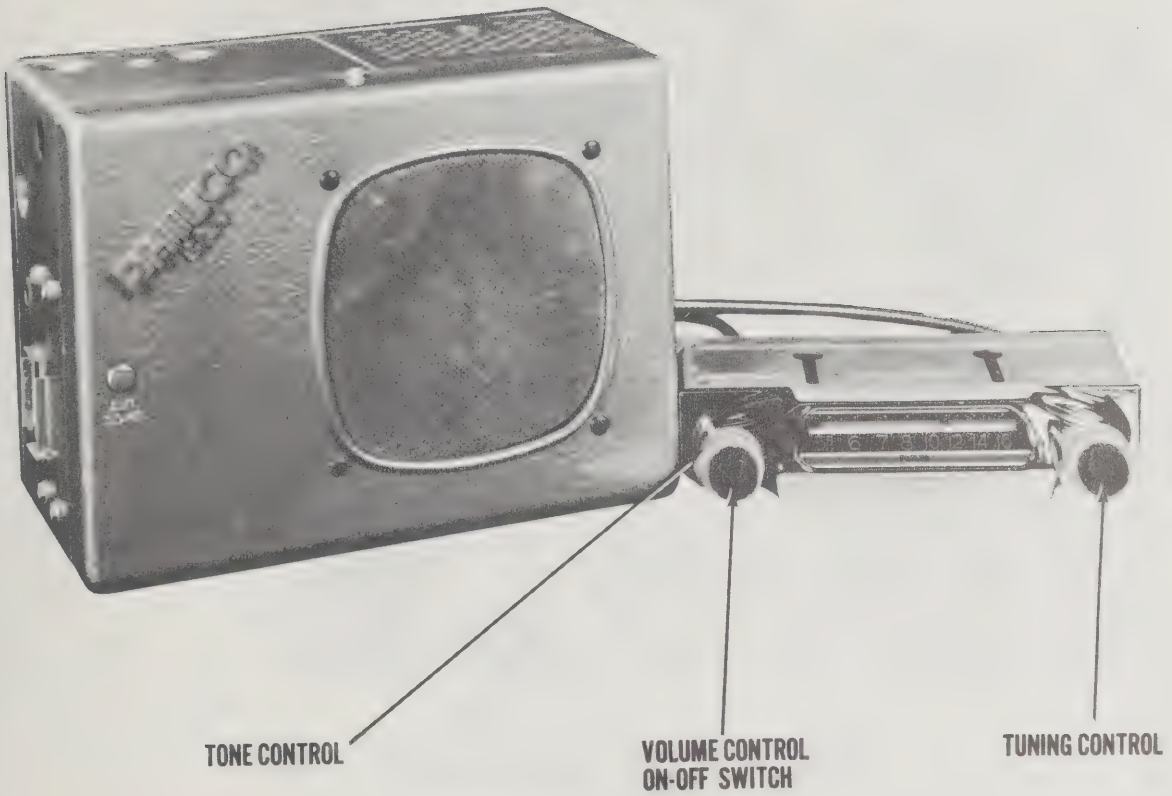
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

PHILCO MODELS
CR-4, CR-6



PHILCO MODELS
CR-4, CR-6

PHILCO MODEL CR-4

TRADE NAME	Philco, Models CR-4, CR-6
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Battery Operated Universal Automotive Superheterodyne Receiver
TUBES (SIX)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AV6 Det.-AVC-AF, 7C5 Power Output, 6X4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	535-1600KC RATING 7 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to ant. receptacle. Low side to chassis.	455KC	535KC	Across voice coil	A1,A2, A3,A4.	Short Pin 1 of 6BE6 to chassis. Adjust A1, A2, A3 and A4 in order given for maximum output once only.
2	20 MMFD 30 MMFD	High side in series with 20 MMFD to ant. receptacle. (Connect 30MMFD from ant. receptacle to chassis.) Low side to chassis.	580KC	Tune for maximum output.	"	A5	Remove short from Pin 1 of 6BE6. Rock tuning control and adjust A5 for maximum output.
3	20 MMFD 30 MMFD	"	1600KC	"	"	A6,A7	Disengage tuning cable and reengage with pointer at 1600KC reference mark. Adjust A6 and A7 for maximum output. Repeat Steps 2 & 3 until no further improvement can be made.

AFTER RECEIVER HAS BEEN INSTALLED IN CAR ADJUST A6 FOR MAXIMUM VOLUME ON A WEAK STATION NEAR 1400KC.

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DATE 2/48 SET #33 FOLDER #483-17

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	IF Amp.	6BA6	6BA6	7BK	
4	Det.-AVC-AF	6AV6	6AV6		
5	Power Output	7C5	7C5	6AA	
6	Rectifier	6X4	6X4	15BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
7A	15	350	61-0089	DY-310	EL-153		UP2235C	■ Filter
B	10	350						▲ "
C	20	25						Cathode Bypass
8	.25	400	61-0125	S-4-25	TC-2	484-.25	DT4P25	RF Bypass Pwr. Supply
9	.5	120	61-0137					Hash Filter
10	.5	100	61-0137					" "
11	.006	1000	61-0105	TM-16-006	TR-26	1084-006	MD16D6	Output Plate Bypass
12	.01	600	61-0120	S-6-01	TC-11	684-01	DT6S1	Audio Coupling
13	.01	600	61-0120	S-6-01	TC-11	684-01	DT6S1	Tone Comp.
14	.01	120	30-1226-10					" "
15	.004	600	61-0179	S-6-004	TC-24	684-004	DT6D4	Audio Coupling
16	.05	400	61-0122	S-4-05	TC-15	484-05	DT4S5	Screen Bypass
17	.05	200	61-0122	S-4-05	TC-15	484-05	DT4S5	IF Cathode Bypass
18	.05	200	61-0122	S-4-05	TC-15	484-05	DT4S5	AVC Filter
19	.05	200	61-0122	S-4-05	TC-15	484-05	DT4S5	RF Cathode Bypass
20	.005	1500	61-0153	TM-16-005	TR-25	1684-005	MD16D5	Buffer
21	330		60-10335407	MO.5-33	1FM-33	1468-0003	5W5T3	Hash Filter-Cer.
22	330		60-10335407	MO.5-33	1FM-33	1468-0003	5W5T3	" " - "
23	100		30-1224-18	MO.5-31	1FM-31	1468-0001	5W5T1	AF Plate Bypass-Cer.
24	100		30-1224-18	MO.5-31	1FM-31	1468-0001	5W5T1	Diode RF Filter-Cer.
25	100		60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	Osc. Grid Cap.
26	55		61-0149					Fixed Trimmer - Cer.
27	390		30-1220-35					" "
28	180		60-10205307					Fixed Pad
29	180		60-10205307					RF Coupling
30	330		60-10335407	MO.5-33	1FM-33	1468-0003	5W5T3	Hash Filter - Cer.

CONTROLS

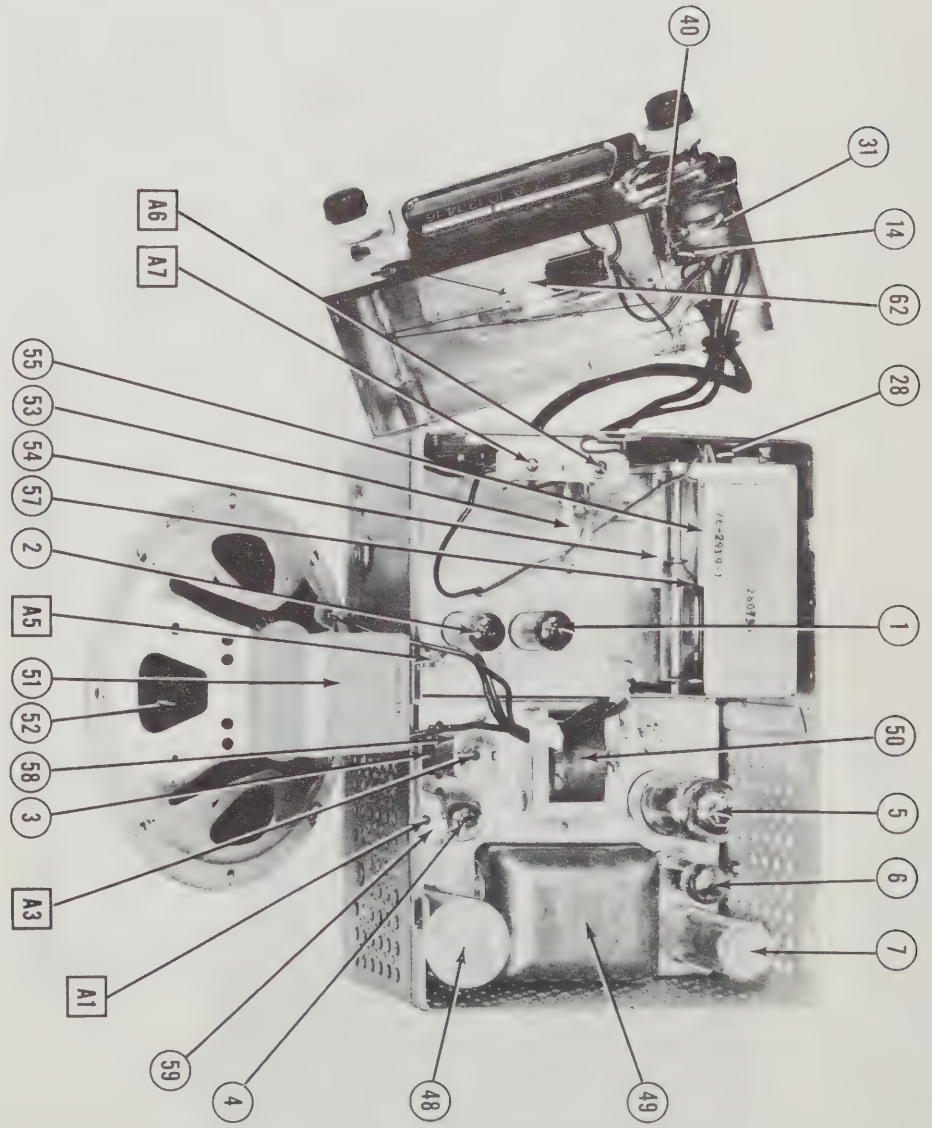
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	
31	350KΩ-5 Meg.	½	33-5557 or 33-5557-1*			Volume - Tone Controls & Sw.-Note

Note-Dual unit operated by concentric shaft.
*Used in buick only.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
32	470Ω	½	66-1473340	BTS-470	Yl.-Vl.-Br. RF Cathode
33	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. RF Plate Load
34	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
35	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
36	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Oscillator Grid
37	2200Ω	½	66-3223340	BTS-2200	Red-Red-Red IF Cathode
38	27KΩ	1	66-3274340	BTA-27K	Red-Vl.-Or. Screen Dropping
39	27KΩ	½	66-3273340	BTS-27K	Red-Vl.-Or. Diode RF Filter
40	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. Tone Compensation
41	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
42	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. AF Plate Load
43	470KΩ	½	66-4473340	BTS-470K	Yl.-Vl.-Yl. Output Grid
44	220Ω	1	66-1224340	BW-1-220	Red-Red-Br. Output Cathode
45	4700Ω	½	66-2473340	BTS-4700	Yl.-Vl.-Red Filter
46	1000Ω	1	66-2104340	BTA-1000	Br.-Blk.-Red Filter
47	100Ω	1	66-1104340	BW-1-100	Br.-Blk.-Br. Hash Suppression
64	100Ω	1	66-1104340	BW-1-100	Br.-Blk.-Br. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: RADIART PART No.	INSTALLATION NOTES
48	Interrupter	6.3	115~	83-0025	5326P	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
49	6.5V DC @ 4.1A	640V CT @ .06A			32-8313		T22R22	

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
50	3800Ω	3.8Ω	470Ω	.9Ω	32-8315	A-3856*	T22S46*	A-2902*	*Remove frame of original and use with replacement.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
	FIELD	VC IMP.		ST-110		Used in Model CR4
51A	PM	3.8Ω	36-1613	Mod. P6-V		
B	4Ω	3.8Ω	36-1609-3			
	CONE DIA.	VC DIA.				
52A	6"	3/4"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			
B	6-3/4"	3/4"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: MEISSNER PART No.	
53	Ant. Choke Coil		7Ω	65-0437		
54	Ant. Coil		10.1Ω	65-0443-7		Items 54, 55, 56 are part of permeability tuner. Item 55 tap @ .9Ω.
55	RF Coil		14.2Ω	65-0443-8		
56	Osc. Coil		2.1Ω	65-0443-9		
57	Osc. Shunt Coil		2Ω	42-4110		Tap @ 1Ω.
58	Input IF	12Ω	12Ω	32-4160	16-6668	
59	Output IF	15Ω	15.5Ω	32-4161	16-6669	
60	RF Choke		.1Ω	32-4170		
61	RF Choke		.1Ω	65-0037		

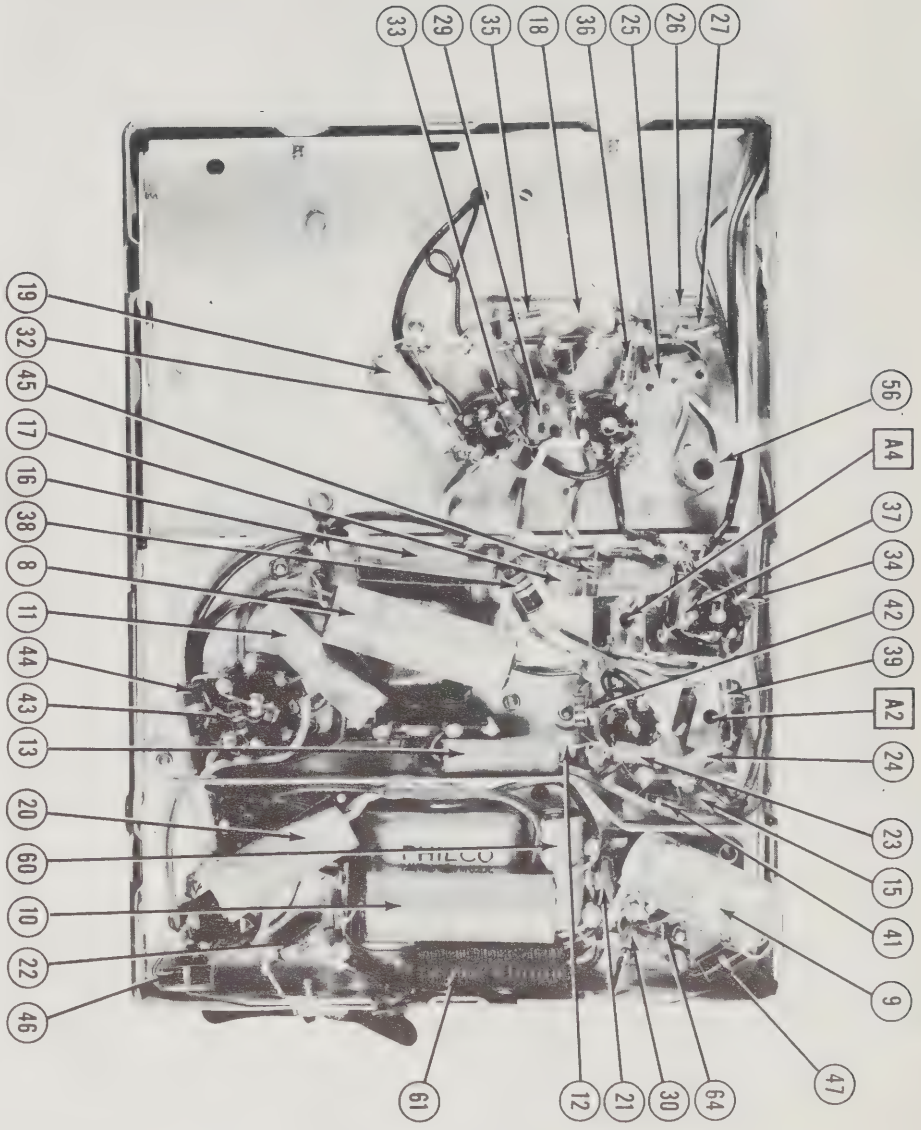
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
62	Bayonet	6-8	0.25	Blue	34-2040		Type 44

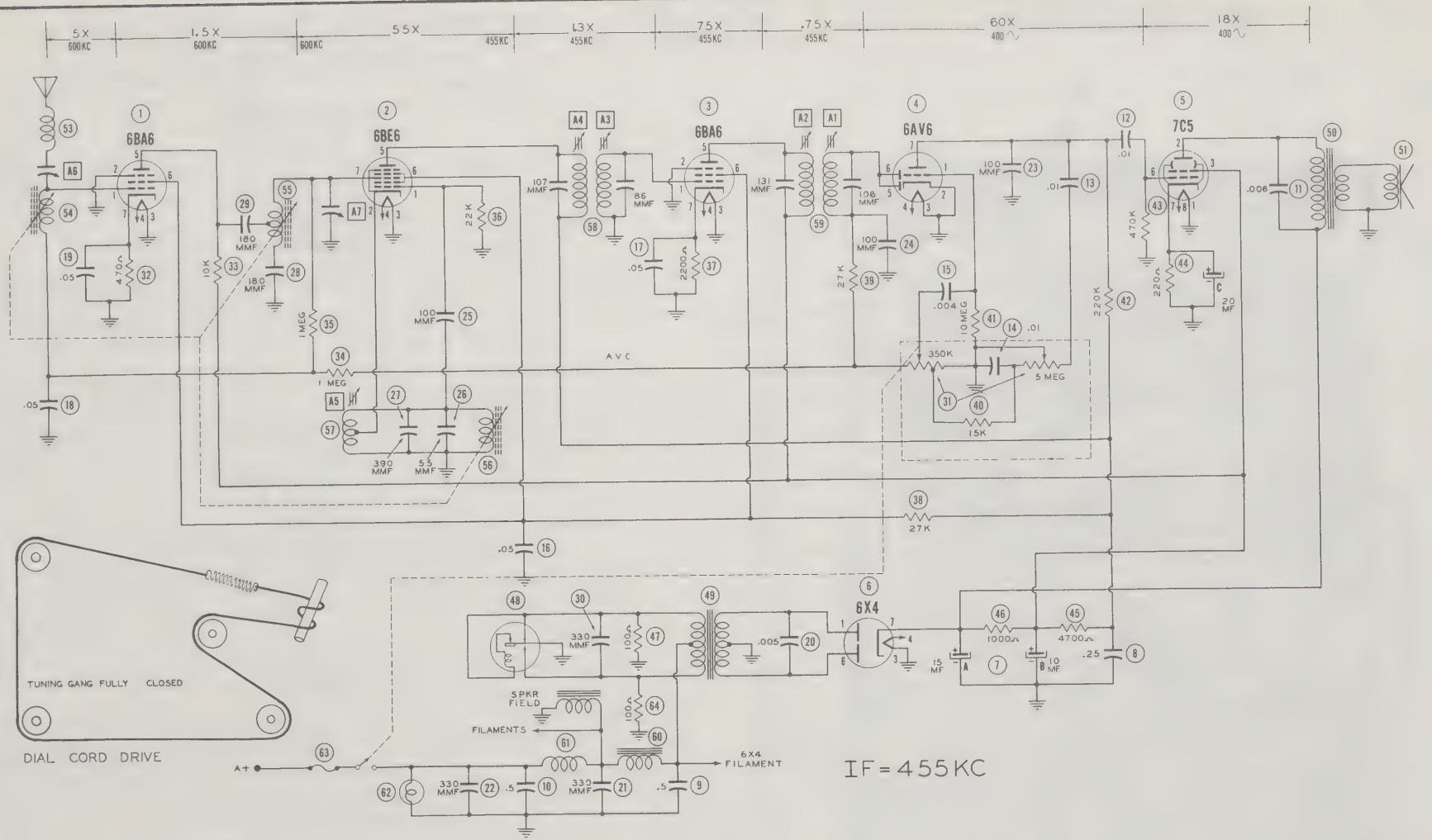
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
63	Fuse	45-2559	14 Amp.
A6	Trimmer	63-0035-4	Ant. Adj.
A7	"	63-0055	RF Adj.

CHASSIS—BOTTOM VIEW



PHILCO MODELS CR-4, CR-6



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1							60VDC	1.5VDC	-
2							60VDC	-.5VDC	-
3							60VDC	3.3VDC	-
4					3.5VDC	-.6VDC	-.6VDC	120VDC	
5						280VDC	0V.	0V.	11.7VDC
6		320VAC	0V.	0V.	6.5VDC	0V.	320VAC	280VDC	-

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1				0Ω	.5Ω	511KΩ	530KΩ	470Ω	-
2						505KΩ	530KΩ	2.5 Meg.	-
3									-
4	AVC					350KΩ	350KΩ	725KΩ	-
5							INF.		
6			0Ω	0Ω	.5Ω	INF.	440Ω	500KΩ	-

TAKEN WITH VACUUM TUBE VOLTMETER.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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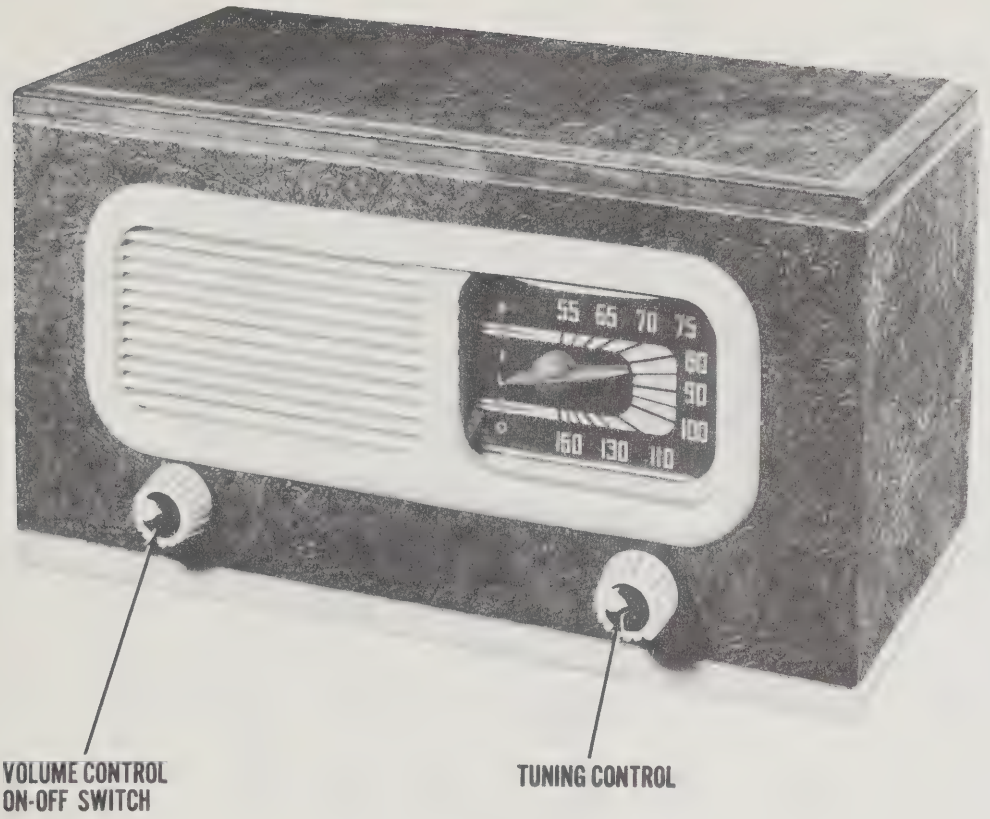
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

483-17

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

PHILCO MODELS
47-204, 47-205



PHILCO MODELS
47-204, 47-205

PHILCO MODEL 47-204

TRADE NAME	Philco, Models 47-204, 47-205
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 7A8 Converter, 14A7 IF Amp., 14B6 Det.-AVC-AF, 50L6GT Power Output, 35Y4 Rectifier.
POWER SUPPLY	105-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1620KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to reference dot at left of dial number "55".

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) 7A8. Low side to B-.	455KC	540KC	Across voice coil	A1,A2, A3,A4.	Turn A4 down tight. Adjust A1, A2, A3 and A4 for maximum output. If isolation transformer is not used reduce dummy to .001 MFD to reduce hum modulation.
2	100MMFD	Disconnect ext. ant. lug from chassis. High side to ext. ant. lead. Low side to B-.	1600KC	1600KC	"	A5	Adjust for maximum output.
3	100MMFD	"	1500KC	Tune for maximum output.	"	A6	" " " "

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DATE 2/48 SET #33 FOLDER #483-18

PARTS LIST AND DESCRIPTIONS

PHILCO MODELS 47-204, 47-205

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	7A8	7A8	8U	
2	IF Amp.	14A7	14A7	8V	
3	Det.-AVC-AF	14B6	14B6	8W	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	30	150	30-2573	DSB-403020-150	TA-230	PRSA150-30-30	E23315	Filter - Or.
B	25	150						" - Blue
C	20	150			UT-301	PRS150-20	BR2015	" - Red
7	.04	400	45-3500-2	MPH-4-04	TC-14	484-04	DT4S4	Line Filter
8	.02	400	61-0108	S-4-02	TC-12	484-02	DT4S2	Output Plate Bypass
9	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
10	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	" "
11	.05	200	61-0122	S-4-05	TC-15	484-05	DT2S5	AVC Filter
12	.05	200	61-0122	S-4-05	TC-15	484-05	DT2S5	Screen Bypass
13	.2	400	76-1161	S-4-.2	TC-2	484-.2	DT4P2	Line Isolation
14	220		60-10205307	MO.5-325	1FM-325	1468-00025	5W5T25	Output Grid Bypass
15	47		60-00515307	MO.5-45	1FM-325	1468-00005	5W5Q5	Osc. Grid Cap.
16	5		60-90505007	MO.5-55	MS-55	1468-000005	5W5V5	Ext. Ant. Coupling

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
17A	500KΩ	½	33-5429	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

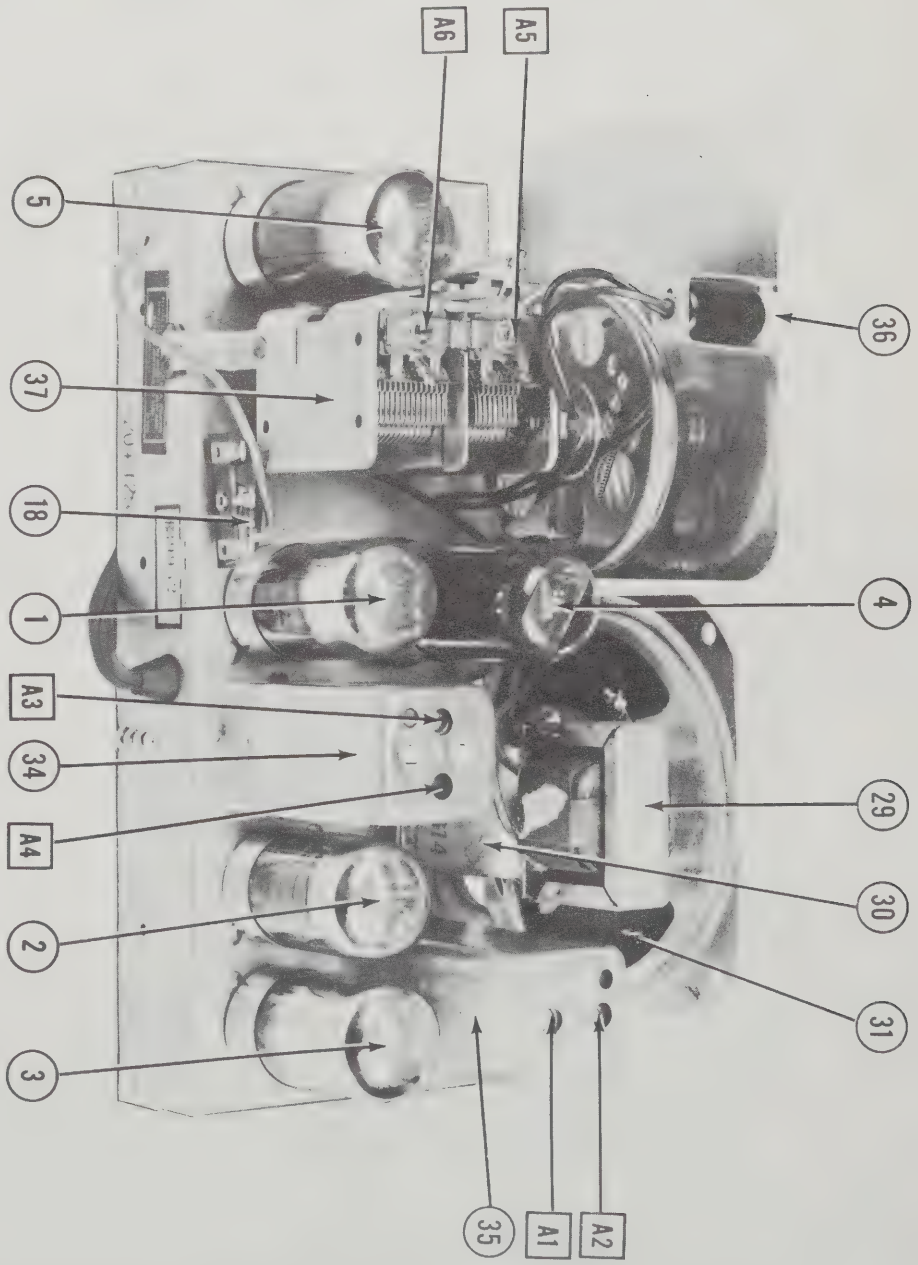
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
18	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Antenna Loading
19	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Oscillator Grid
20	27KΩ	½	66-3273340	BTS-27K	Red-Vi.-Or. Screen Dropping
21	3.3 Meg.	½	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
22	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
23	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
24	130Ω	½	66-1133340	BW-½-120	Br.-Or.-Br. Output Cathode
25	1200Ω	½	66-2123340	BTS-1200	Br.-Red-Red Filter
26	220Ω	1	66-1224340	BW-1-220	Red-Red-Br. "
27	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Line Isolation
28	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. AVC Network

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
29	1750Ω	3.1Ω	175Ω	.7Ω	Part of 36-1614	A-3876*	T22S45*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA PHILCO PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-113†		†Fabricate new mounting bracket.
30	PM	3.1Ω	36-1614	Mod. P4-X		
	CONE DIA.	VC DIA.				
31	4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

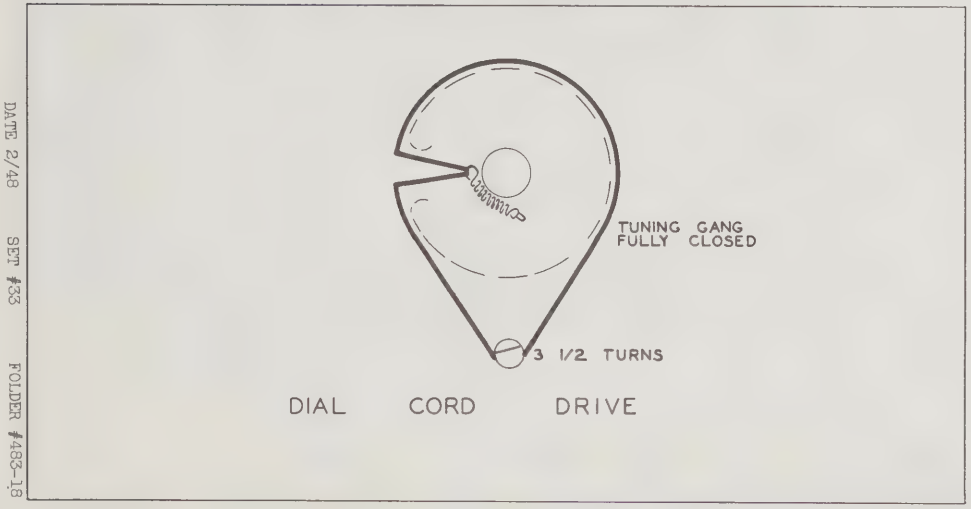
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	MEISSNER PART No.	
32A	Loop Ant.			32-4052-1		For use in model #47-205 only
B	" "		2.9Ω	32-4052-3		For use in Model #47-204 only
33	Osc. Coil	2.5Ω	7.5Ω	32-3880	14-1040	
34	Input IF	24.1Ω	23.9Ω	32-3967	16-6658	
35	Output IF	20.2Ω		32-3952	16-6670	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA PHILCO PART No.		INSTALLATION NOTES
36	Bayonet	6-8	0.15	Brown	34-2068		Type 47

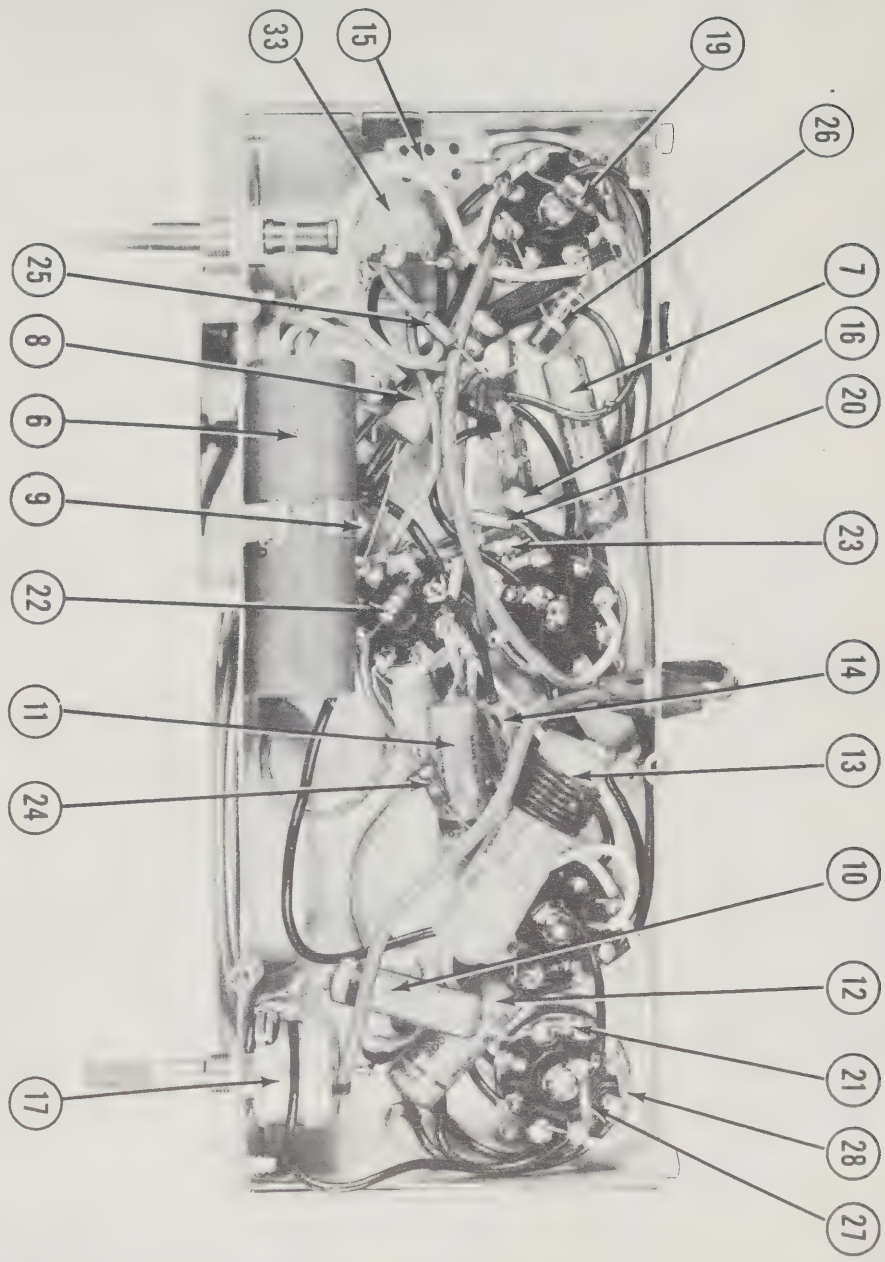
MISCELLANEOUS

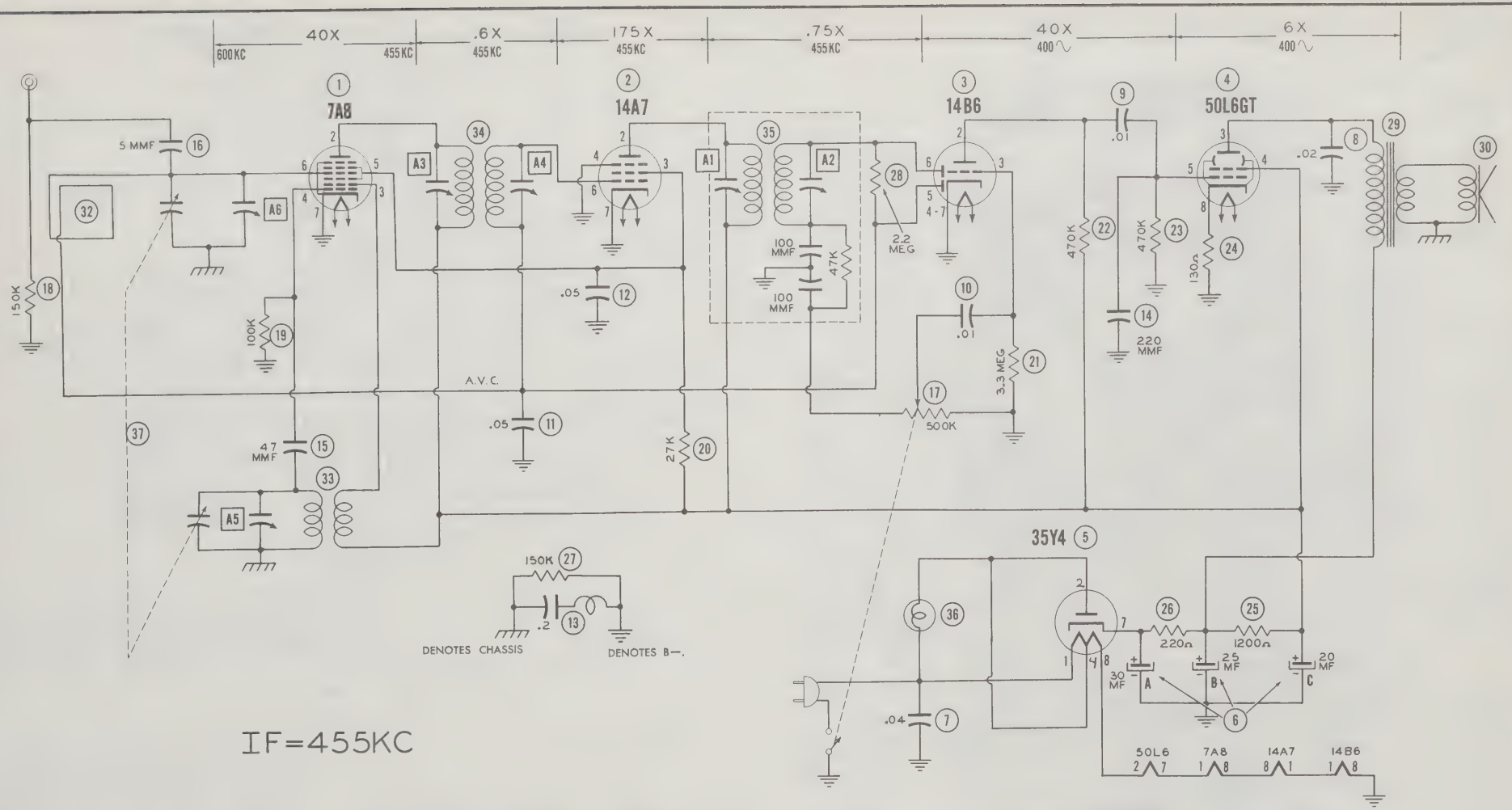
ITEM No.	PART NAME	PHILCO PART No.	NOTES
37	2 Gang Var. Cap.	31-2527-2	(18-496MMF, 20-175MMF)
	Knob	54-4375	Model 47-204
	"	54-4228	Model 47-205
	Pointer	54-4148-1	
	Dial Scale	27-5953	Model 47-204
	" "	27-5952	Model 47-205



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	36VAC	100VDC	100VDC	$-18VDC	42VDC	-.7VDC	0V	25VAC
2	14A7	13.5VAC	100VDC	42VDC	0V	0V	-.7VDC	0V	25VAC
3	14B6	13.5VAC	50VDC	-.8VDC	0V	-.7VDC	-.6VDC	0V	0V
4	50L6	50VDC	85VAC	105VDC	100VDC	0V	-.7VDC	36VAC	6VDC
5	35Y4	117VAC	113VAC	$-18VDC	113VAC	100VDC	0V	122VDC	85VAC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	34Ω	50KΩ	50KΩ	100KΩ	80KΩ	3Meg	0Ω	25Ω
2	14A7	13Ω	80KΩ	80KΩ	0Ω	0Ω	3Meg	0Ω	25Ω
3	14b6	13Ω	500KΩ	3.5Meg	0Ω	3Meg	500KΩ	0Ω	0Ω
4	50L6	500KΩ	80Ω	50KΩ	50KΩ	450KΩ	3Meg	34Ω	130Ω
5	35Y4	105Ω	100Ω	100KΩ	100Ω	50KΩ	0Ω	50KΩ	80Ω

§TAKEN WITH VACUUM TUBE VOLTMETER.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

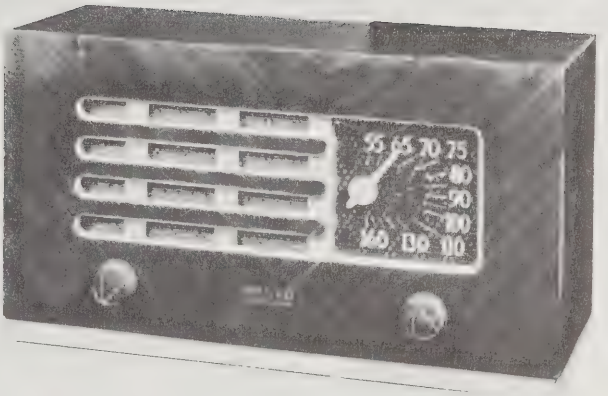
483-18

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHILCO MODELS 48-200,
48-200-I, 48-214

MODEL 48-200-I



MODEL 48-214

PHILCO MODELS 48-200,
48-200-I, 48-214

TRADE NAME	Philco, Models 48-200, 48-200-I, 48-214
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 7A8 Converter, 14A7 IF Amp., 14B6 Det.-AVC-AF, 50A5 or 50L6GT Power Output, 35Z5GT or 35Y4 Rectifier.
POWER SUPPLY	105-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1620KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to index dot to left of "55" on dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Preset A4 by turning down tight. If isolation trans. is not used reduce dummy ant. to .001 MFD to reduce hum modulation. Adjust A1, A2, A3 and A4 for maximum output.
2	100MMFD	High side to ext. ant. lead. (Disconnect from grounding self-tapping screw) Low side to B-.	1600KC	1600KC	"	A5	Adjust for maximum output.
3	100MMFD	"	1500KC	Tune for maximum output.	"	A6	" " " "

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DATE 2/48 SET #33 FOLDER #483-19

PARTS LIST AND DESCRIPTIONS

PHILCO MODELS 48-[illegible]

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	7A8	7A8	8U	
2	IF Amp.	14A7	14A7	8V	
3	Det.-AVC-AF	14B6	14B6	8W	
4A	Power Output	50A5	50A5	6AA	
B	" "	50L6GT	50L6GT	7AC	
5A	Rectifier	35Z5GT	35Z5GT	6AD	
B	"	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	30	150	30-2573	DSB-403020-150	TA-330 UT-201	PRS150-30-30 PRS150-20	EZ42215	Filter - Or. " - Blue " - Red
7	.04	400	45-3500-2	MPH-4-05	TC-14	484-04	DT4S4	Line Filter
8	.02	400	61-0108	S-6-02	TC-12	484-02	DT4S2	Output Plate Bypass
9	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
10	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	" "
11	.05	200		S-4-05	TC-15	484-05	DT2S5	AVC Filter
12	.2	400	30-4644					Line Isolation*
13	.05	200	61-0122	S-4-05	TC-15	484-05	DT2S5	Screen Bypass
14	220		60-10205307	MO.5-45	1FM-325	1468-00025	5W5T25	Output Grid Bypass-Cer.
15	47		60-00515307	MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.
16	5		60-90505007	MO.5-55	MS-55	1468-000005	5W5V5	RF Coupling

*Special resonant cap.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
17A	500KΩ	½	33-5429	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

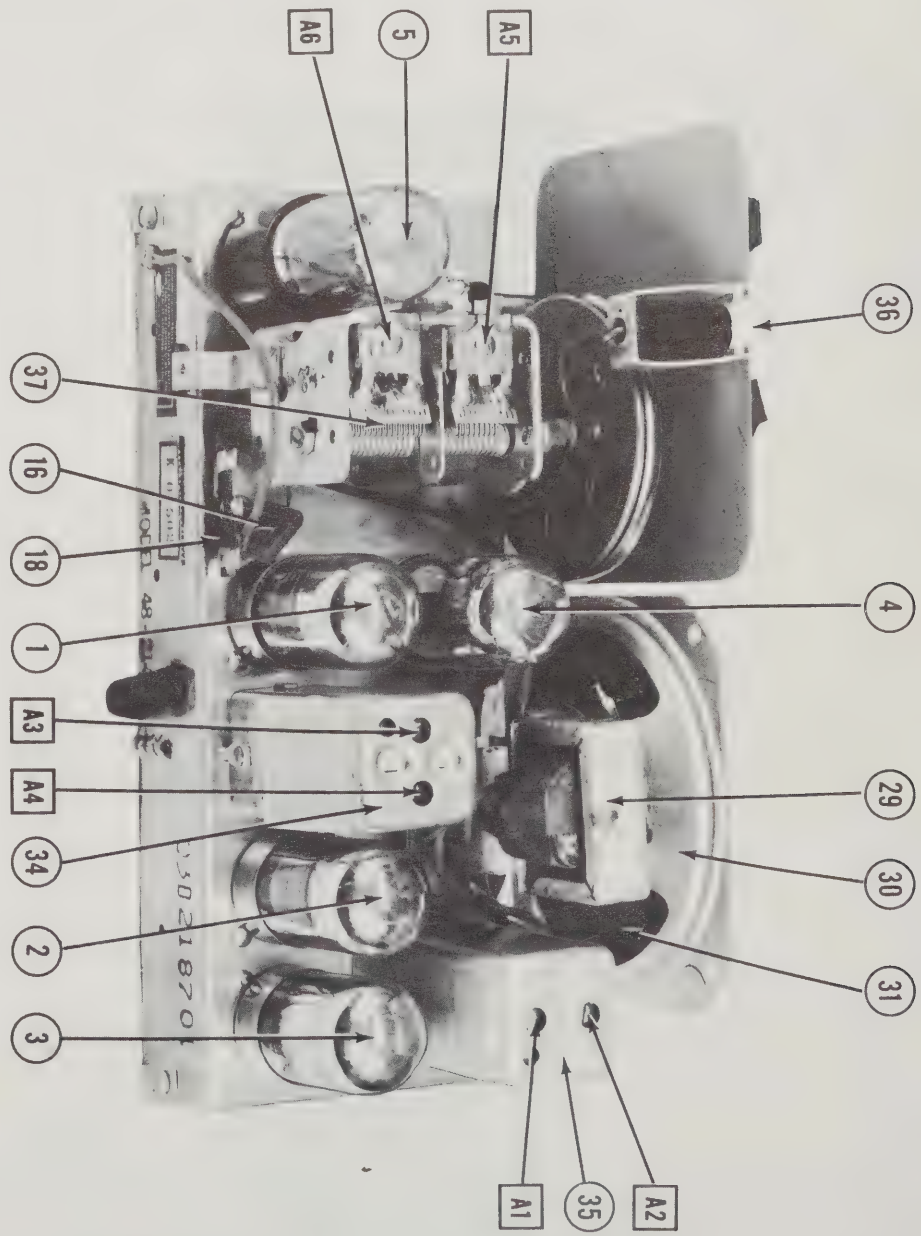
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
18	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Antenna Loading
19	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Oscillator Grid
20	27KΩ	½	66-3273340	BTS-27K	Red-Vi.-Or. Screen Dropping
21	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
22	3.3 Meg.	½	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
23	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
24	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
25	130Ω	½	66-1133340	BW-½-120	Br.-Or.-Br. Output Cathode
26	220Ω	1	66-1224340	BW-1-220	Red-Red-Br. Filter
27	1200Ω	½	66-2123340	BTS-1200	Br.-Red-Red "
28	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Line Isolation

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
29	1750Ω	3.1Ω	175Ω	.7Ω	Part of 36-1614	A-3876‡	T22845‡	A-2928‡	‡Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA PHILCO PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-1131		†Fabricate new mounting bracket.
30	PM	3.1Ω	36-1614	Mod. P4-X		
	CONE DIA.	VC DIA.				
31	4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

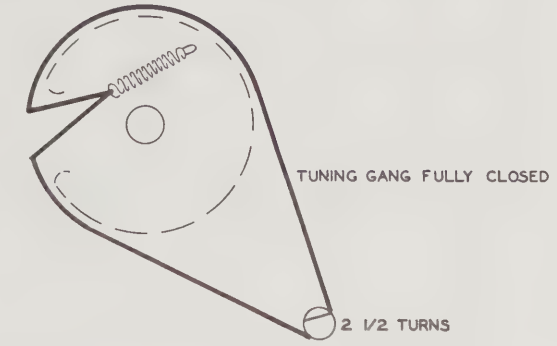
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	MEISSNER PART No.	
32A	Loop Ant.			32-4052-5		For Model 48-200, 48-200-I only
B	" "		2.9Ω	32-4052-6		For Model 48-214 only.
33	Osc. Coil	2.5Ω	7.5Ω	32-3880	14-1040	
34	Input IF	24.1Ω	23.9Ω	32-3967	16-6658	
35	Output IF	20.2Ω		32-3952	16-6670	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA PHILCO PART No.		INSTALLATION NOTES
36	Bayonet	6-8	0.15	Brown	34-2068		Type 47

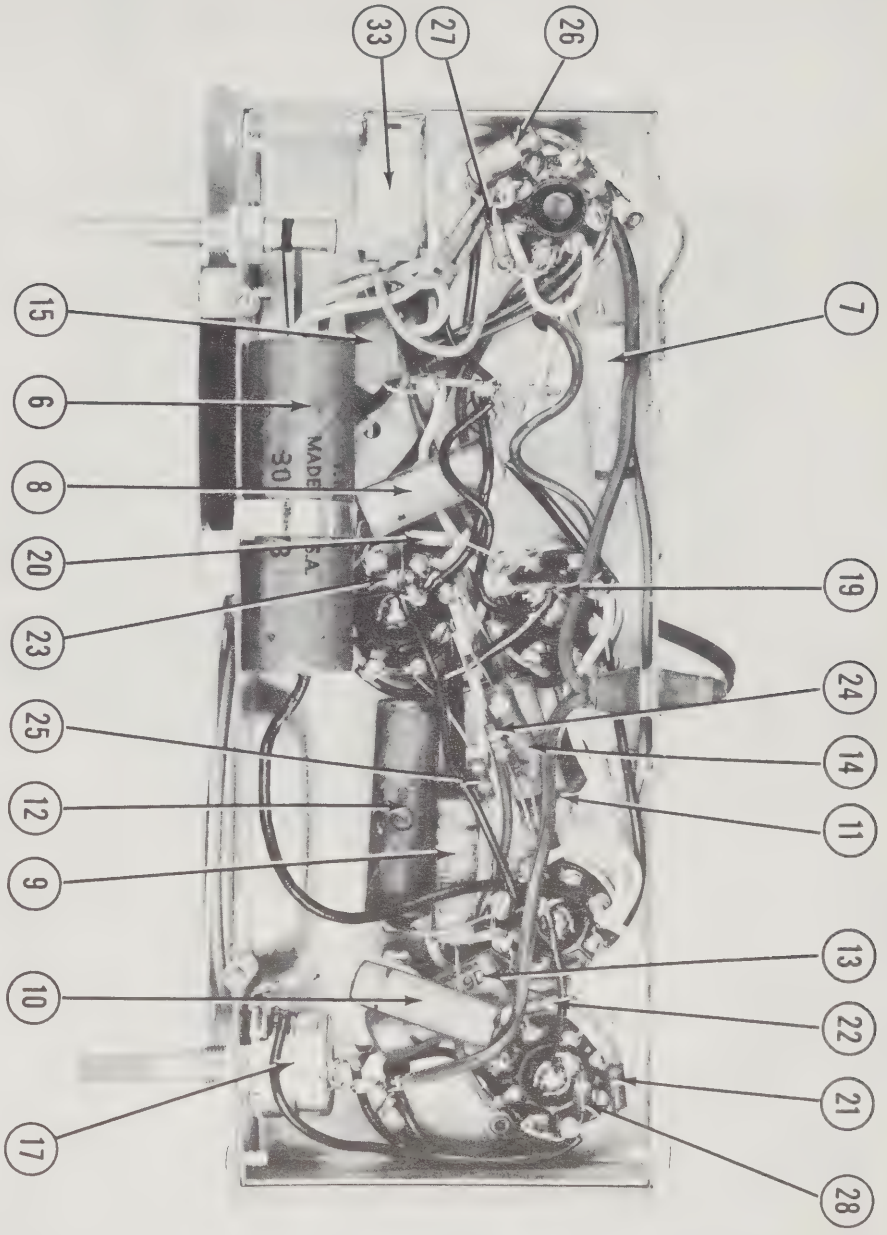
MISCELLANEOUS

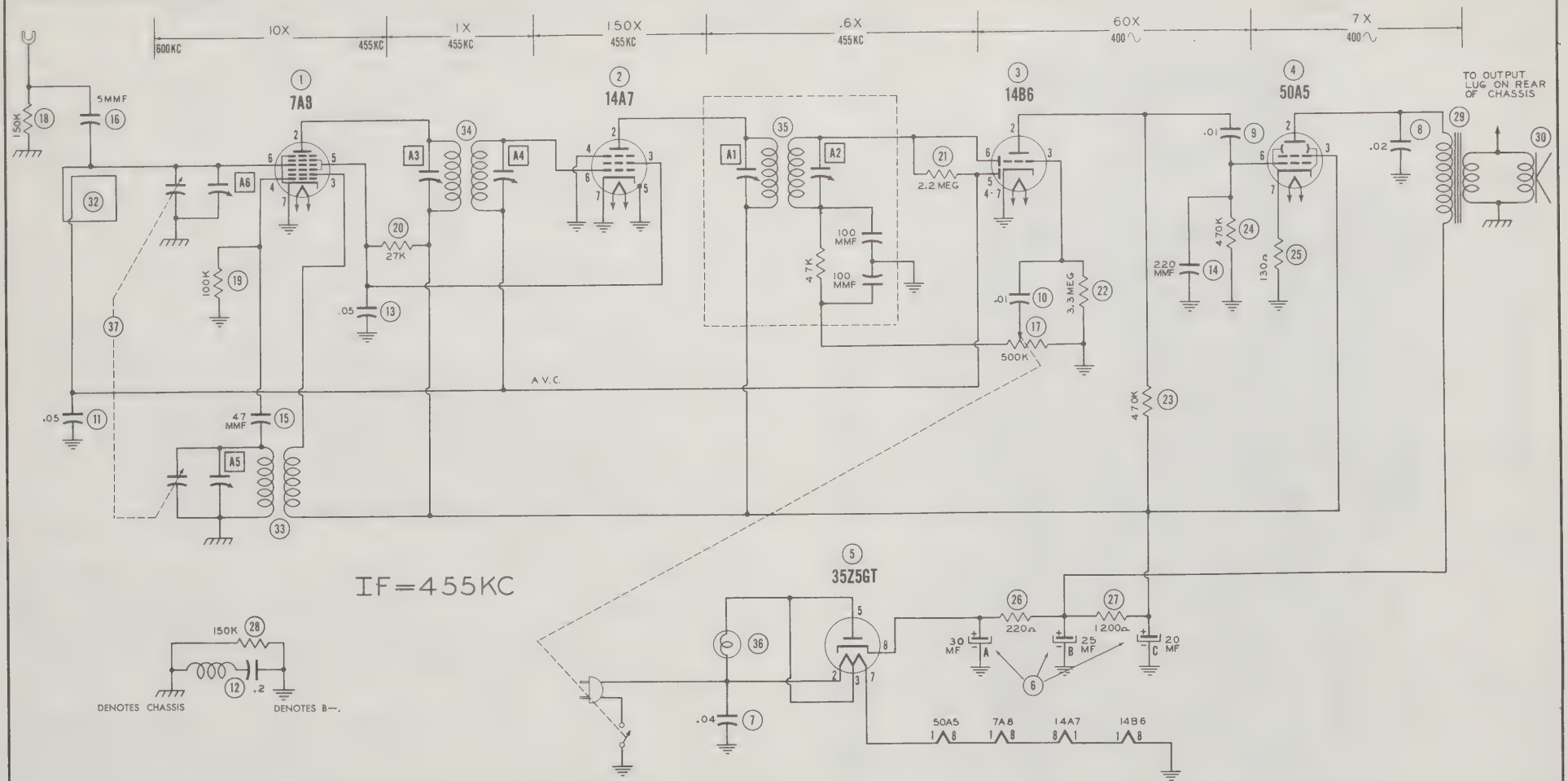
ITEM No.	PART NAME	PHILCO PART No.	NOTES
37	2 Gang Var. Cap	31-2527-2	(18-496 MMF, 20-175MMF)
	Dial Pointer	27-4891	Models 48-200, 48-200-I
	" "	54-4148-2	Model 48-214
	Dial Scale	25-5713	Model 48-200
	" "	27-5840	Model 48-200-I
	" "	27-5839	Model 48-214



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	34VAC	100VDC	100VDC	-14VDC§	42VDC	-.8VDC	0V.	27VAC
2	14A7	13.5VAC	100VDC	42VDC	0V.	0V.	-.8VDC	0V.	27VAC
3	14B6	13.5VAC	55VDC	-.8VDC	0V.	-.8VDC	-.8VDC	0V.	0V.
4	50A5	85VAC	105VDC	100VDC	55VDC	-.8VDC	0V.	6.1VDC	34VAC
5	35Z5	0V.	117VAC	112VAC	100VDC	112VAC	112VDC	85VAC	125VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	32Ω	50KΩ	50KΩ	100KΩ	77KΩ	3 Meg.	0Ω	35Ω
2	14A7	12.5Ω	50KΩ	77KΩ	0Ω	0Ω	3 Meg.	0Ω	25Ω
3	14B6	12.5Ω	520KΩ	3.5 meg.	0Ω	3 Meg.	500KΩ	0Ω	0Ω
4	50A5	80Ω	50KΩ	50KΩ	520KΩ	3 Meg.	500KΩ	14Ω	32Ω
5	35Z5	INF.	105Ω	102Ω	50KΩ	102Ω	50KΩ	0Ω	50KΩ

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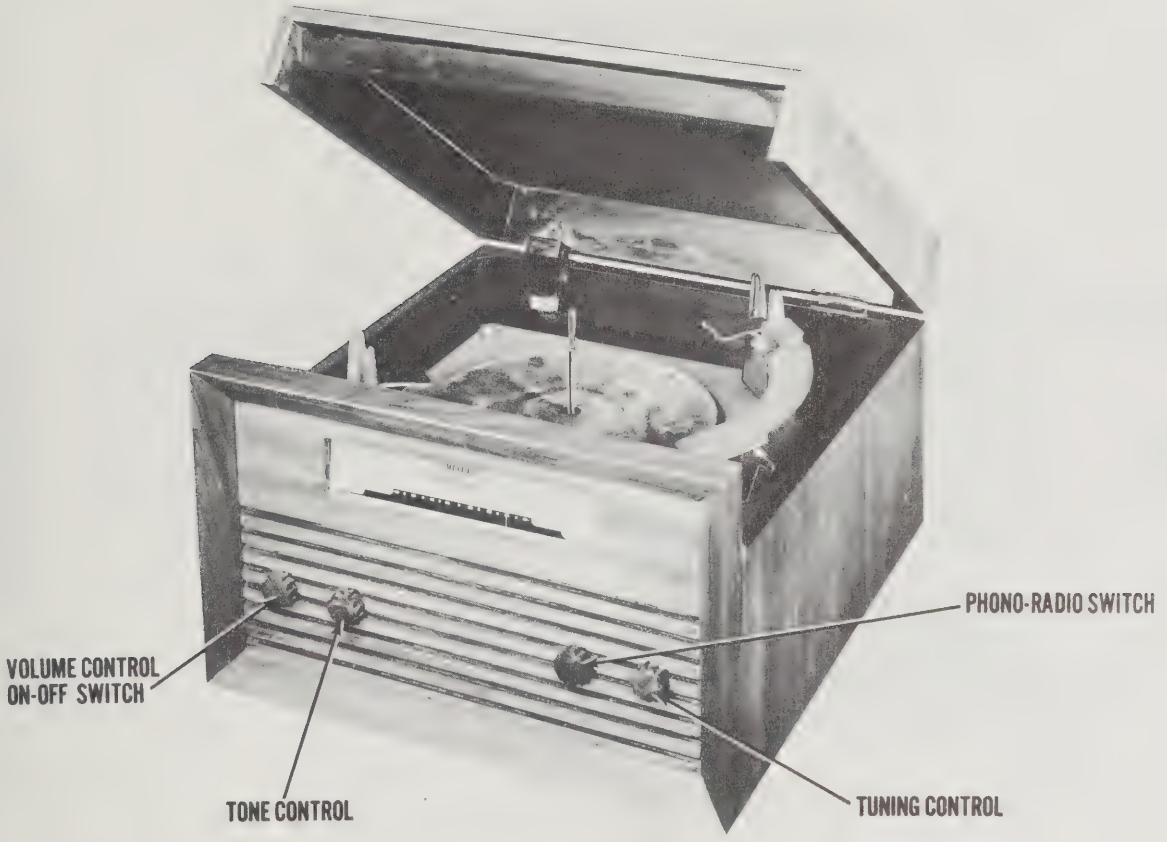
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHILHARMONIC
MODEL 100T



PHILHARMONIC
MODEL 100T

PHILHARMONIC MINUET MODEL 100T

TRADE NAME	Philharmonic, Minuet Model 100T
SUPPLIER	Philharmonic Chicago Inc., 1714 S. State St., Chicago, Ill.
TYPE SET	AC Operated Phono-Radio Combination Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	115-120 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .22 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to rear stator of tuning cap. Low side to B-.	456KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1400KC	1400KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	"	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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DATE 2/48 SET #33 FOLDER #483-20

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILHARMONIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BG	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILHAR. PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	CD-1226	DSB-2x40-150	TA-430	PRSA150-30-40	EDL4415	Filter - Red
B	30	150						" - Grn.
7	10	25	CD-1224	M-10-25	TA-10	PRS25-10	BR102A	Cathode Bypass
8	.05	400	CD-1227-13	MPH-4-05	TC-15	484-05	DT4S5	Line Filter
9	.01	400	CD-1227-8	S-4-01	TC-11	484-01	DT4S1	Output Plate Bypass
10	.0015	400	CD-1227-2	MW.5-215	1FM-215	1467-0015	1W5D15	Tone Comp.
11	.02	400	CD-1227-10	S-4-02	TC-12	484-02	DT4S2	Audio Coupling
12	.002	400	CD-1227-3	S-6-002	S-4-22	484-002	DT4D2	" "
13	.05	400	CD-1227-13	S-4-05	S-4-15	484-05	DT4S5	AVC Filter
14	.5	400	CD-1227-19	S-4-.5	S-4-.5	484-.5	DT4P5	Line Isolation
15	250		CD-1071-28	MO.5-325	1FM-325	1468-00025	5W5T25	Diode RF Filter
16	100		CD-1071-22	MO.5-31	1FM-31	1468-0001	5W5T1	Osc. Grid Cap.
17	14							Fixed Trimmer - Cer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILHARMONIC PART No.	MALLORY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
18A	500KΩ	½	RE-1164		D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.		A	Not Req.	Attach to 18A per instructions
C	Switch		" "		41	SW-A	" " " " "
19A	250KΩ	½	RE-1165		D13-130	M-64-Z	Tone Control
B	Shaft		Not Req.		A	Not Req.	Attach to 19A per instructions

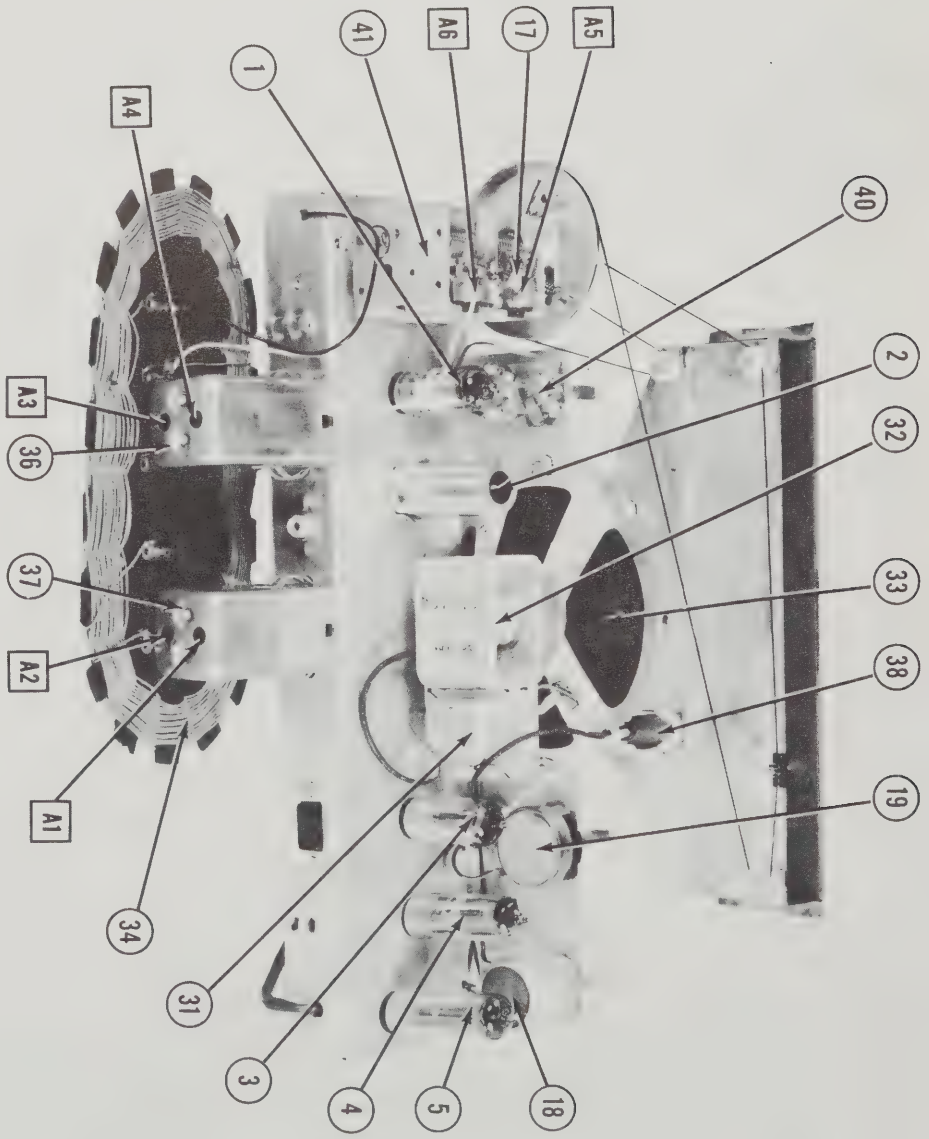
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILHARMONIC PART No.	IRC PART No.	IDENTIFICATION CODES
20	20KΩ	½	RE-1166-206	BTS-22K	Red-Blk.-Or. Oscillator Grid
21	15 Meg.	½	RE-1166-159	BTS-15 Meg.	Br.-Grn.-Blue AVC Network
22	3 Meg.	½	RE-1166-308	BTS-3.3 Meg.	Or.-Blk.-Grn. " "
23	51KΩ	½	RE-1166-516	BTS-47K	Grn.-Br.-Or. Diode RF Filter
24	15 Meg.	½	RE-1166-159	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
25	510KΩ	½	RE-1166-507	BTS-470K	Grn.-Br.-Yl. AF Plate Load
26	510KΩ	½	RE-1166-507	BTS-470K	Grn.-Br.-Yl. Output Grid
27	150Ω	½	RE-1003-154	BW-½-150	Br.-Grn.-Br. Output Cathode
28	2200Ω	1	RE-1168-225	BTA-2200	Red-Red-Red Filter
29	15Ω	1	RE-1169	BW-1-15	Br.-Grn.-Blk. Rectifier Ballast
30	220Ω	½		BW-½-220	Red-Red-Br. Pilot Light Shunt

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILHARMONIC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
31	2250Ω	3.4Ω	190Ω	.9Ω	Part of SK-1011	A-3876*	T22S45*	A-2923*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: PHILHARMONIC PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
	FIELD	VC IMP.		ST-105		
32	PM	3.4Ω	SK-1011	Mod. P5-X		
	CONE DIA.	VC DIA.				
33	4-3/4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: PHILHARMONIC PART No.	REPLACEMENT DATA: MEISSNER PART No.	
34	Loop Ant.	.1Ω	1Ω	AT1018		
35	Osc. Coil		5.5Ω	CI1049	14-1040	Tapped .5Ω
36	Input IF	20Ω	17.8Ω	TR1052	16-6658	
37	Output IF	23.6Ω	23.5Ω	TR1051	16-6660	

DIAL LIGHT

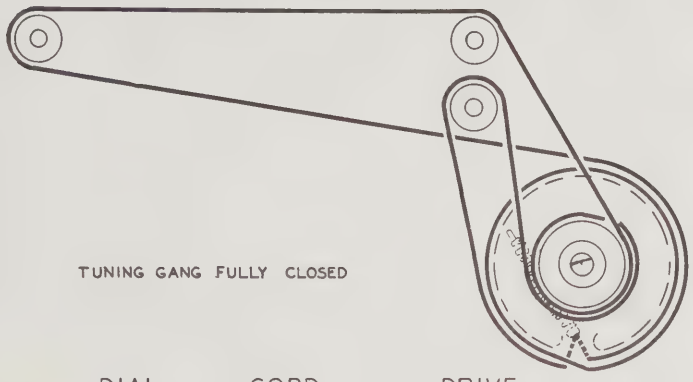
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: PHILHARMONIC PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
38	Bayonet	6-8	0.15	Brown	LA-1014-32		Type 47

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: PHILHAR. PART No.	REPLACEMENT DATA: ASTATIC PART No.	REMARKS
39		L-40-A	

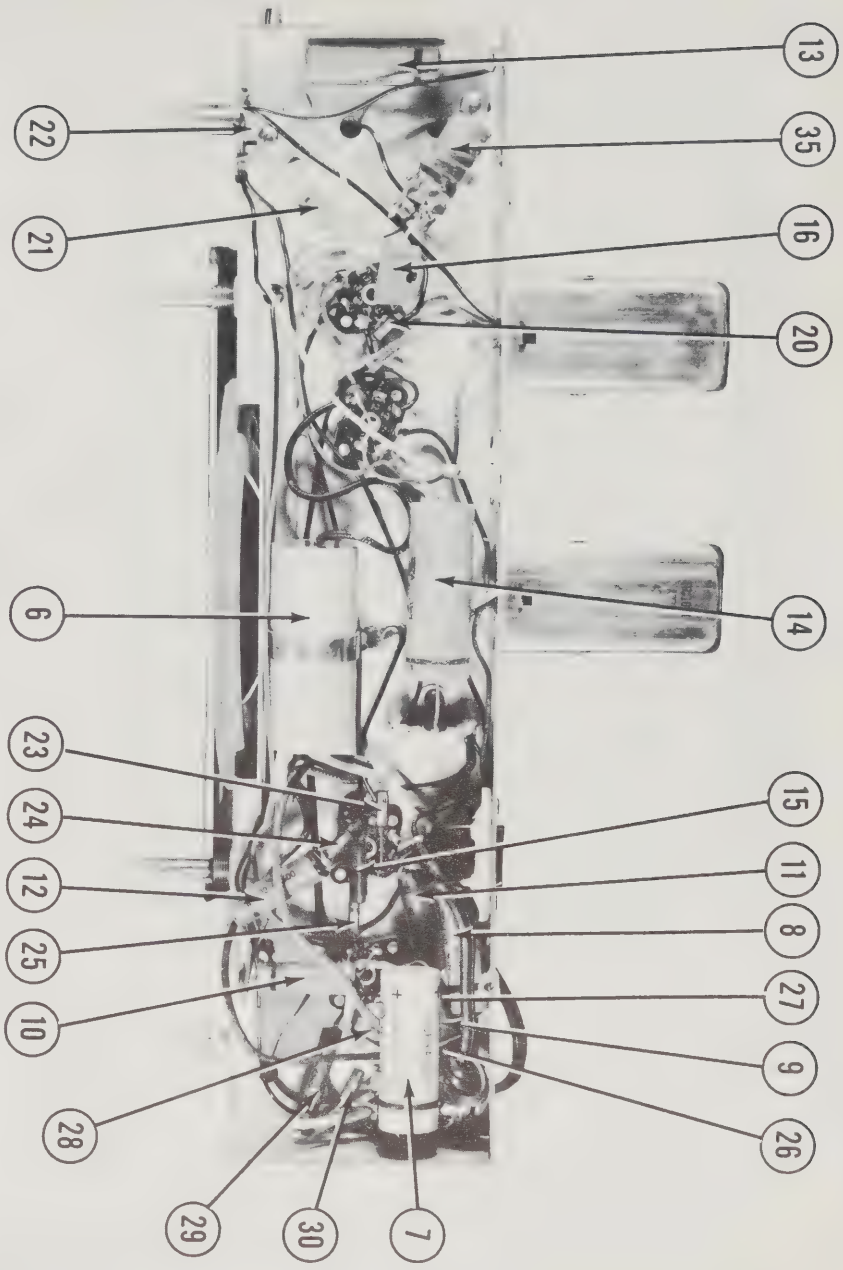
MISCELLANEOUS

ITEM No.	PART NAME	PHILHARMONIC PART No.	NOTES
40	Switch	SW-1060	Radio-Phono
41	2 Gang Var. Cap.	CD1217	(30-475MMF, 24-188MMF)
	Dial Pointer	1N-1024	
	Dial	AS-3362	Glass
	Knob	KN-1053	



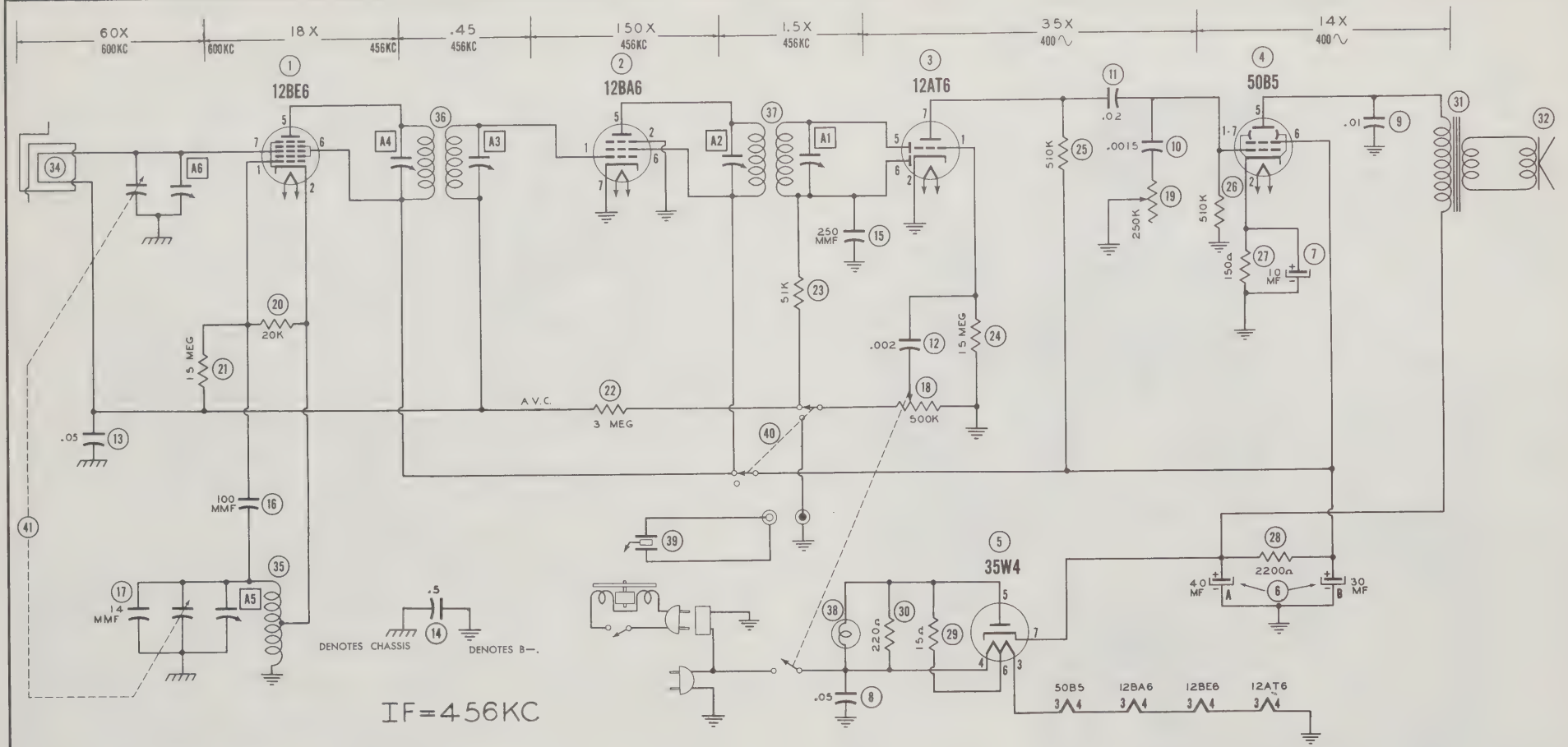
DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



DATE 2/48 SET #33 FOLDER #483-20

PHILHARMONIC MINUET MODEL 1001



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	§-10VDC	0V	25VAC	12.5VAC	85VDC	85VDC	-.4VDC
2	12BA6	-.4VDC	0V	39VAC	25VAC	95VDC	85VDC	0V
3	12AT6	-.8VDC	0V	1.5VAC	0V	-.6VDC	-.6VDC	35VDC
4	50B5	0V	5VDC	87VAC	39VAC	115VDC	85VDC	0V
5	35W4	0V	0V	87VAC	117VAC	114VAC	115VAC	124VDC

RADIO-PHONO SWITCH IN RADIO POSITION.
§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin
1	12BE6	22KΩ	.6Ω	25Ω	12.6Ω	100KΩ	100KΩ	4Meg
2	12BA6	4Meg	0Ω	38Ω	25Ω	100KΩ	100KΩ	0Ω
3	12AT6	1.5Meg	0Ω	12.6Ω	0Ω	580KΩ	580KΩ	600K
4	50B5	500KΩ	160Ω	79Ω	38Ω	100KΩ	100KΩ	500KΩ
5	35W4	0Ω	0Ω	79Ω	110Ω	121Ω	107Ω	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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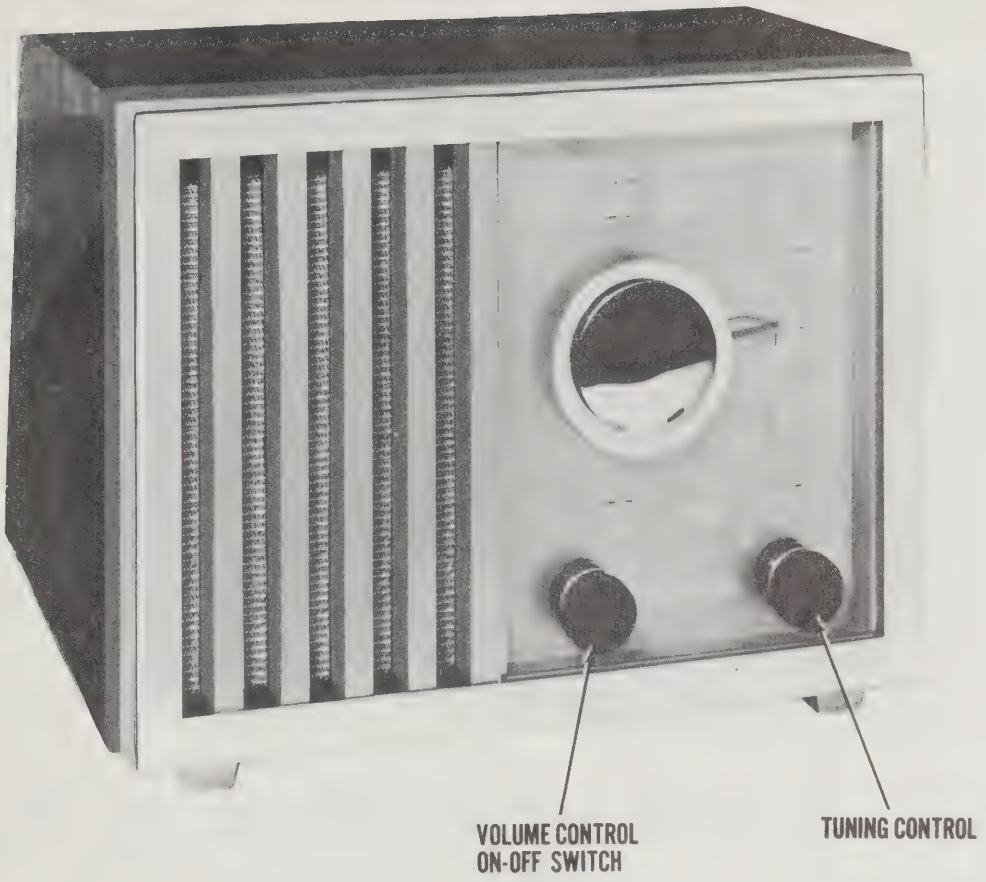
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RCA (VICTOR) MODELS
75X11, 75X12 (Ch. RC-1050)



RCA (VICTOR) MODELS
75X11, 75X12 (Ch. RC-1050)

RCA VICTOR MODEL 75X11

TRADE NAME	RCA (Victor), Models 75X11, 75X12 (Ch. RC-1050)
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, N.J.
TYPE SET	AC-DC Operated Superheterodyne with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .24 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) 12SK7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.1 MFD.	High side to rear stator of tuning cap. Low side to B-.	455KC	"	"	A3,A4.	Adjust for maximum output. Do not repeak A1 and A2.
3	200MMFD	High side to ext. ant. lead. Low side to B-.	1620KC	"	"	A5	"
4	200MMFD	"	1400KC	Tune for maximum output.	"	A6	"
5	200MMFD	"	600KC	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 and 5 until no further improvement can be made.

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DATE 3 DATE 2/48 SET #33 FOLDER #483-21

PARTS LIST AND DESCRIPTIONS

RCA (Victor) MODELS 75X11, 75X12 (Ch. RC-1050)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RCA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	50	150	70408	M-5030-150	TA-530	PRSA150-30-50	BRD3515	Filter - Red
B	30	150						" - Plain
7	.05	400	70615	MPH-4-05	TC-15	484-05	DT4S5	Rectifier Bypass
8	.03	400	70613	S-6-03	TC-13	484-03	DT4S3	Output Plate Bypass
9	.005	400	70606	S-6-005	TC-25	464-005	DT6D5	Audio Coupling
10	.01	400	70610	S-4-01	TC-11	484-01	DT4S1	" "
11	.05	400	70615	S-4-05	TC-15	484-05	DT4S5	AVC Filter
12	.01	400	70610	S-4-01	TC-11	484-01	DT4S1	Ext. Ant. Isolation
13	.1	400	70617	S-4-1	TC-1	484-.1	DT4P1	Line Isolation
14	330		72793	MO.5-33	1FM-33	1468-0003	5W5T3	AF Plate Bypass
15	150			MO.5-315	1FM-315	1468-00015	5W5T15	RF Bypass

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	500KΩ	½	38410	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 16A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

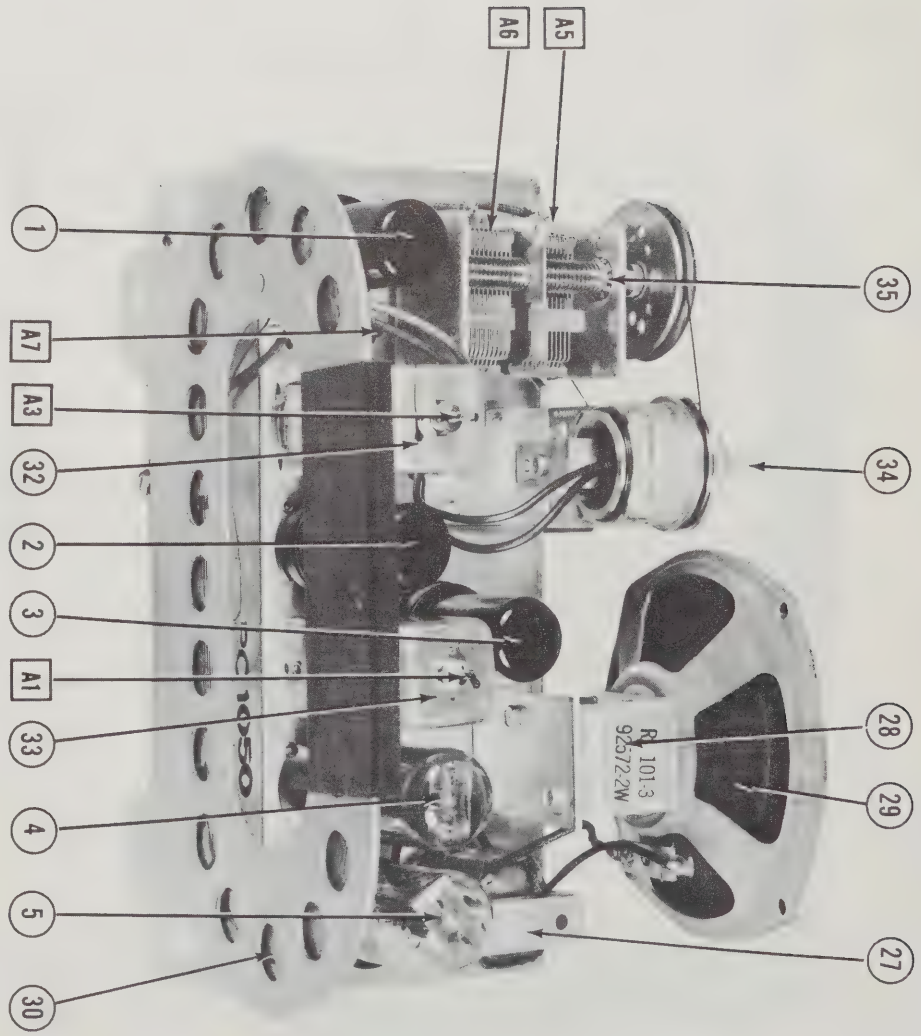
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA PART No.	IRC PART No.	IDENTIFICATION CODES
17	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation
18	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
19	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
20	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode RF Filter
21	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
22	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
23	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
24	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
25	1200Ω	1		BTA-1200	Br.-Red-Red Filter
26	33Ω		72313		Or.-Or.-Blk. Surge Limiter-See Note

Note-This is a special fuse type resistor.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RCA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
27	1800Ω	3.8Ω	211Ω tapped @ 11Ω	.5Ω	72296	A-3676*		A-2928*	*Drill new mounting holes and add extra filter to reduce hum level.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA RCA PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-105†		†Fabricate new mounting bracket.
28	PM	3.8Ω	72201	Mod. P5-X		
	CONE DIA.	VC DIA.				
29	4½"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

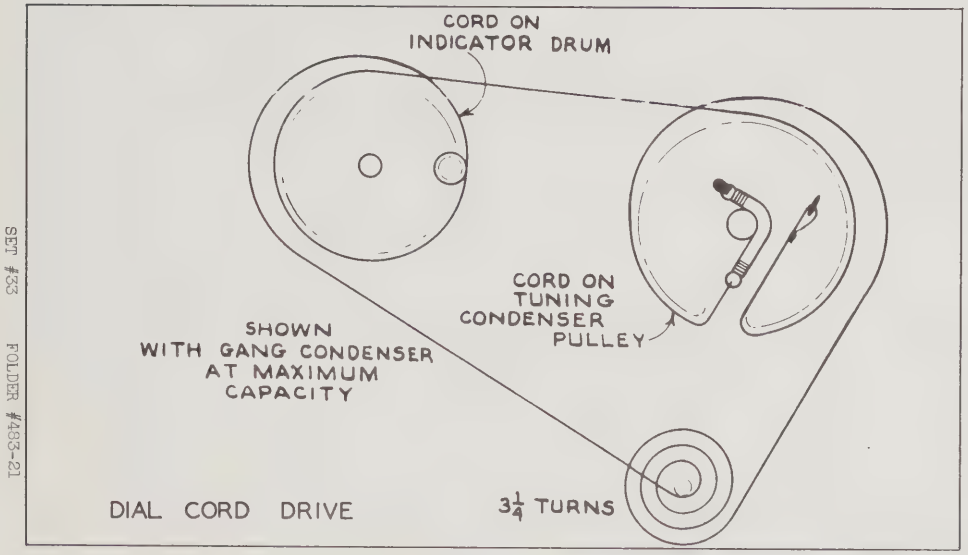
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RCA PART No.	MEISSNER PART No.	
30	Loop Ant.	.1Ω	1.2Ω	72867		
31	Osc. Coil	.5Ω	4Ω	70477	14-1040*	*Add 50 MMFD from grid to high side tuning cap.
32	Input IF	9.4Ω	10.1Ω	71558	16-5740	
33	Output IF	8Ω	8Ω	71631	16-5742‡	‡Add 100MMFD from low side sec. to B-.

DIAL LIGHT

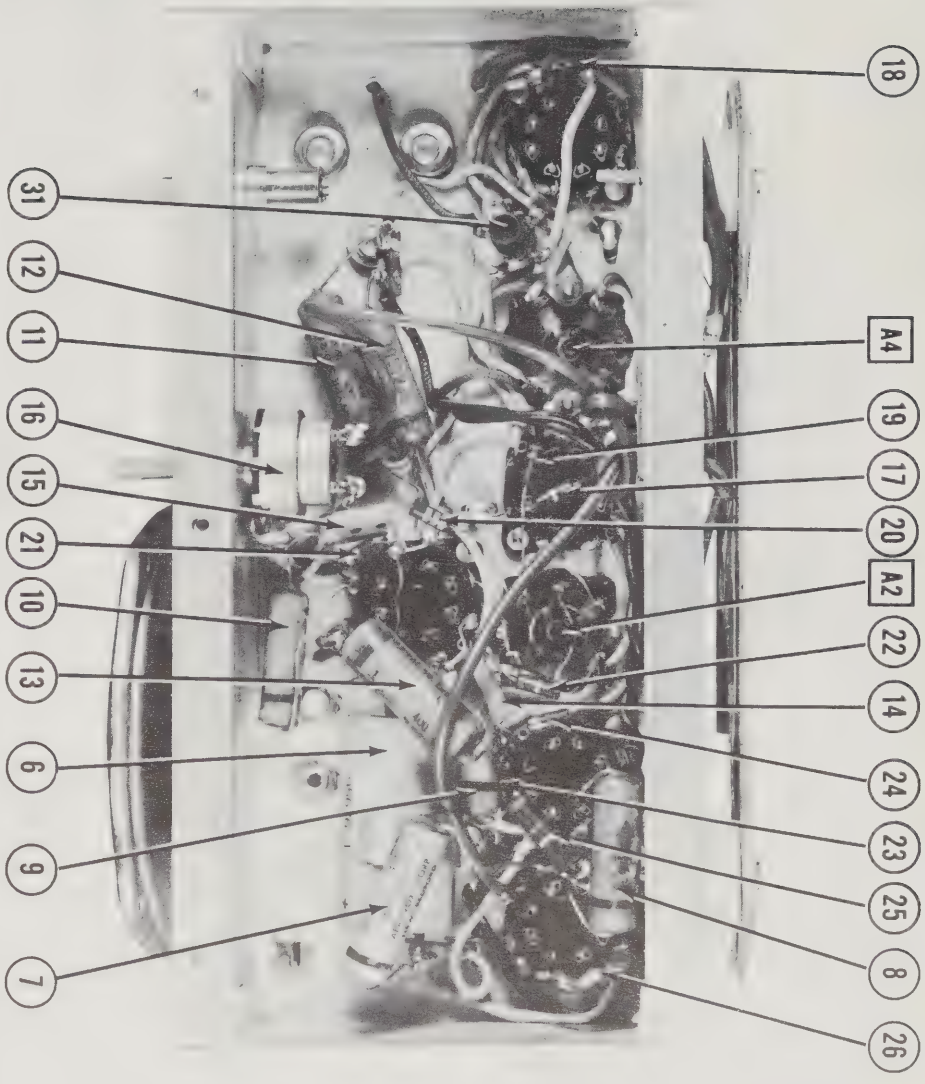
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA RCA PART No.		INSTALLATION NOTES
34	Bayonet	6-8	0.15	Brown	31480		Type 47

MISCELLANEOUS

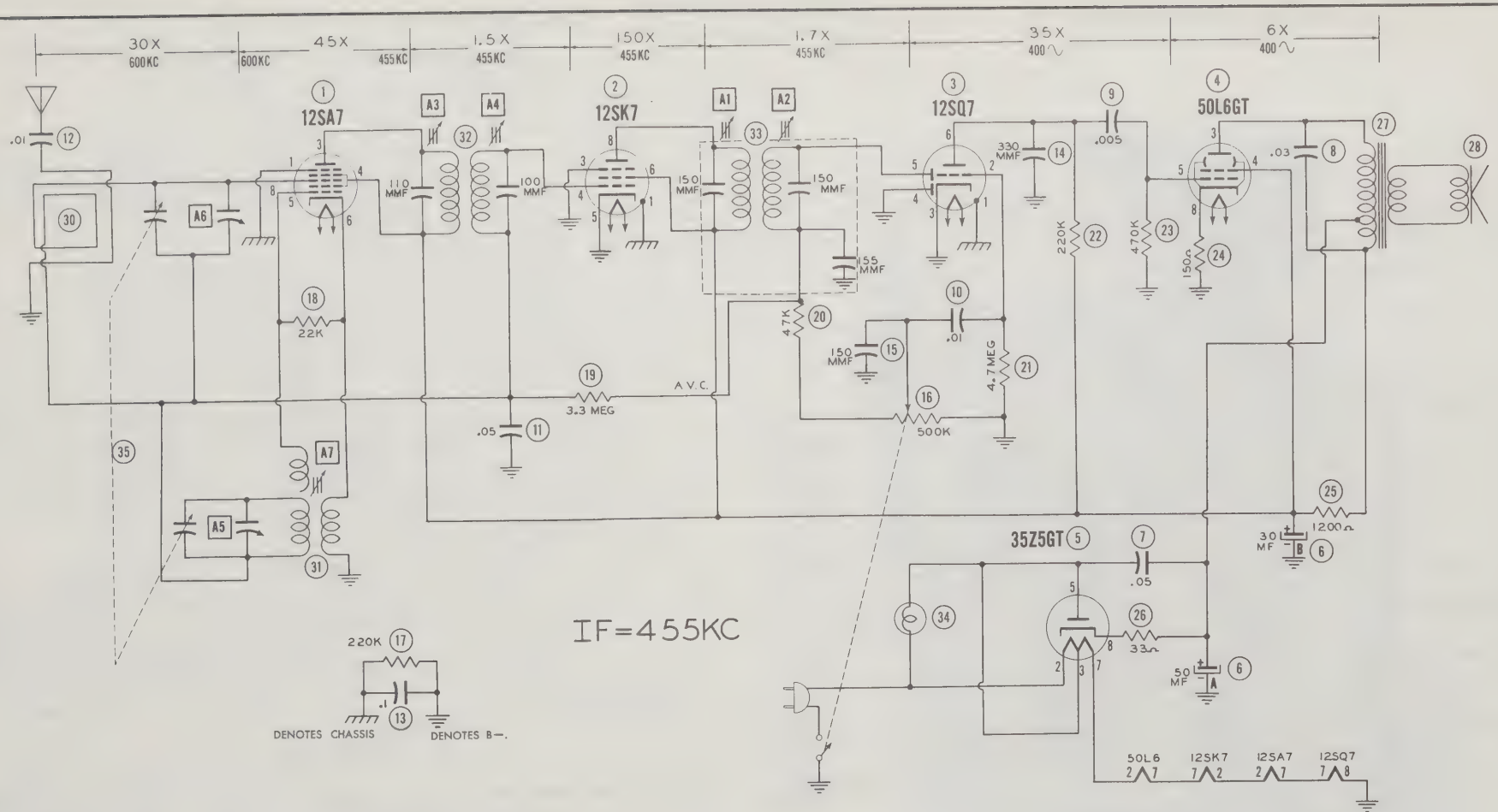
ITEM No.	PART NAME	RCA PART No.	NOTES
35	2 Gang Var. Cap.	72992	(24-410MMF, 25-152MMF)
	Dial Scale	72868	
	Dial Pointer	72869	
	Knob	72870	Model 75X11
	"	72890	Model 75X12


CORD ON INDICATOR DRUM
CORD ON TUNING CONDENSER PULLEY
SHOWN WITH GANG CONDENSER AT MAXIMUM CAPACITY
DIAL CORD DRIVE
3¼ TURNS

CHASSIS—BOTTOM VIEW



RCA (Victor) Models 75X11, 75X12 (Ch. RC-105C)



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	25VAC	87VDC	87VDC	11.5VDC§	0V.	12VAC	-.4VDC
2	12SK7	0V.	25VAC	0V.	-.4VDC	0V.	87VDC	38VAC	87VDC
3	12SQ7	0V.	-.5VDC	0V.	0V.	-.4VDC	57VDC	12VAC	0V.
4	50L6GT	0V.	85VAC	109VDC	87VDC	0V.	0V.	38VAC	5.9VDC
5	35Z5GT	0V.	117VAC	114VAC	115VDC	114VAC	116VDC	85VAC	118VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	220KΩ	25Ω	100KΩ	100KΩ	22KΩ	1Ω	13Ω	4 Meg.
2	12SK7	220KΩ	25Ω	0Ω	4 Meg.	0Ω	100KΩ	38Ω	100KΩ
3	12SQ7	220KΩ	5 Meg.	0Ω	0Ω	600KΩ	320KΩ	13Ω	0Ω
4	50L6GT	INF.	86Ω	100KΩ	100KΩ	470KΩ	0Ω	38Ω	150Ω
5	35Z5GT	INF.	115Ω	112Ω	100KΩ	112Ω	100KΩ	86Ω	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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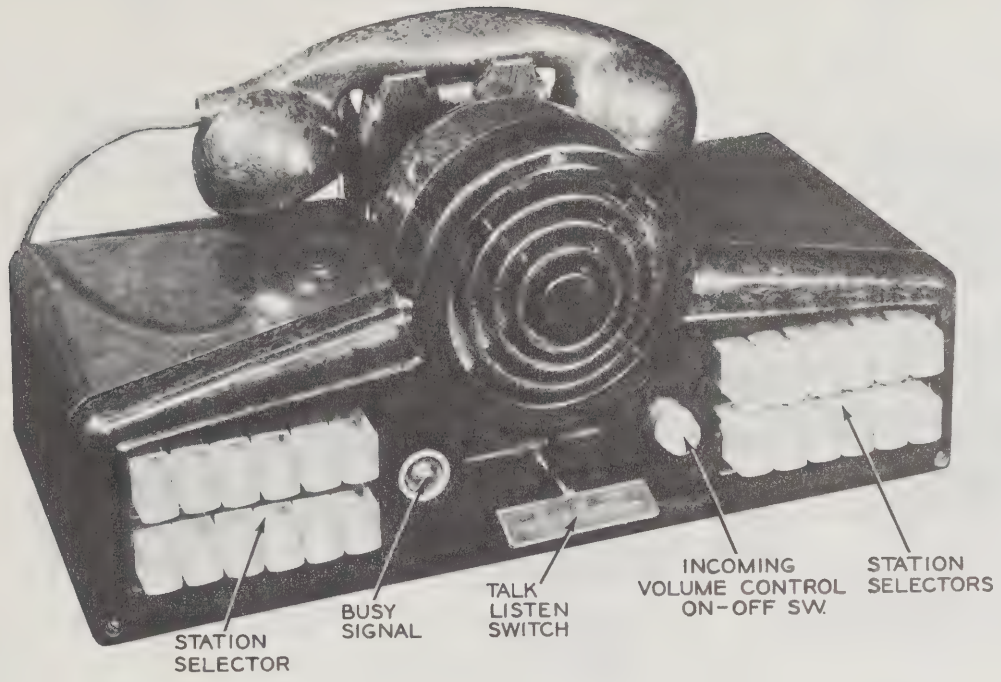
483-21

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RAULAND 2400 SERIES
AMPLICALLS



RAULAND 2400 SERIES
AMPLICALLS

RAULAND MODEL 2424H

TRADE NAME	Rauland, Models 2406, 2406H, 2412, 2412H, 2418, 2418H, 2424, 2424H
MANUFACTURER	The Rauland Corp., 4245 No. Knox Ave., Chicago 41, Ill.
TYPE SET	AC Operated Private Intercommunication System
TUBES (FOUR)	Types, 6AU6 AF Amp., 6AT6 AF Amp., 6AQ5 Power Output, 6X4 Rectifier.
POWER SUPPLY	110-120 Volts AC RATING .27 Amps. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6AU6	0V.	.9VDC	8VDC*	8VDC*	110VDC	24VDC	.9VDC
2	6AT6	0V.	1.2VDC	8VDC*	8VDC*	0V.	0V.	87VDC
3	6AQ5	0V.	8VDC	8VDC*	8VDC*	200VDC	215VDC	0V.
4	6X4	200VAC	0V.	8VDC*	8VDC*	8VDC	200VAC	250VDC

*MEASURE 6.2VAC BETWEEN FILAMENT PINS.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6AU6	550Ω	3KΩ	200Ω	200Ω	300KΩ	1.1 Meg.	3KΩ
2	6AT6	470KΩ	2KΩ	200Ω	200Ω	0Ω	0Ω	300KΩ
3	6AQ5	0Ω	200Ω	200Ω	200Ω	150KΩ	150KΩ	0Ω
4	6X4	95Ω	INF.	200Ω	200Ω	200Ω	105Ω	105KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

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DATE 2/48 SET #33 FOLDER #483-22

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		RAULAND PART No.	STANDARD REPLACEMENT		
1	AF Amp.	6AU6	6AU6	7BK	
2	" "	6AT6	6AT6	7BT	
3	Power Output	6AQ5	6AQ5	7BZ	
4	Rectifier	6X4	6X4	15BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	RAULAND PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	
5A	25	350	CE-656A	DY-3x20-450	EL-32	AP444J	UP9DJ50		◓ Filter
B	20	300			UT-203				■ "
C	20	300							▲ "
6A	15	150	CE-956A	DY-311	EL-242		UP44315C*		◓ "
B	40	25			UT-161				■ Cathode Bypass
C	40	25							▲ " "
7	20	25	CE-026E	M-20-150	UT-201	PRS150-20	BR202A		Transmitter Bypass-§
8	.01	600		S-6-01	TC-11	684-01	DT6S1		Neon Bulb Coupling
9	.001	600		S-6-001	TC-21	684-001	DT6D1		AF Plate Bypass
10	.05	400		S-4-05	TC-15	484-05	DT4S5		AF Screen Bypass
11	.5	400		S-4-.5	TC-5	484-.5	DT4P5		Receiver Bypass
12	.2	200		S-4-.2	TC-2	484-.2	DT4P2		Receiver Coupling
13	200			MO.5-32	1FM-32	1468-0002	5W5T2		Audio Coupling
14	500			MO.5-35	1FM-35	1468-0005	5W5T5		" "
15	47			MO.5-45	1FM-45	1468-00005	5W5Q5		AF Grid Bypass

*Do not use bypass section.
§Some models use 16MFD. @ 350V.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	RAULAND PART No.	IRC PART No.	CLAROSTAT PART No.	
16	500Ω	½	RP-501B			Incoming Volume Control & Sw.
17A	1 Meg.	½	RP-105W	D13-137#	M-63-Z#	Outgoing volume control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions

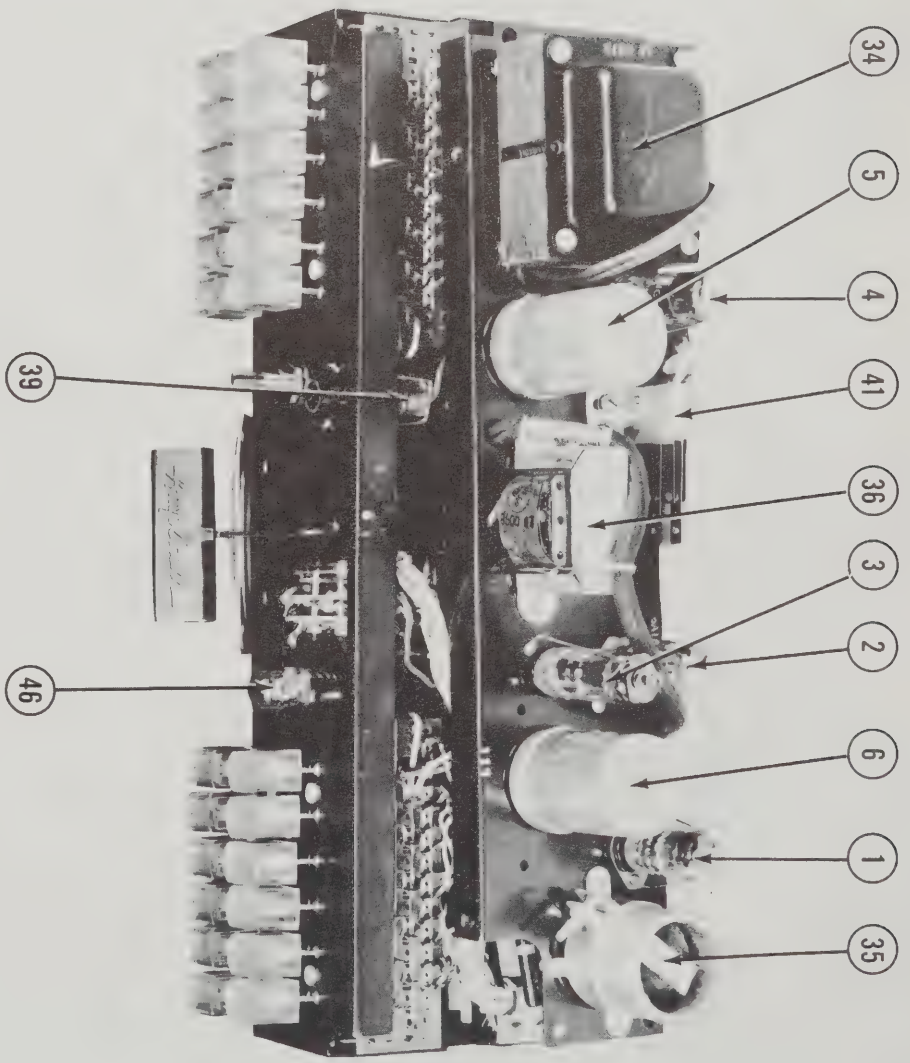
#File out slot in shaft to duplicate original.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	RAULAND PART No.	IRC PART No.	
18	68Ω	½		BW-½-68	Blue-Gray-Blk. Input Transformer Shunt
19	68Ω	½		BW-½-68	Blue-Gray-Blk. Input Volume Network
20	220Ω	½		BW-½-220	Red-Red-Br. Input Volume Network
21	3000Ω	½		BTS-3300	Or.-Blk.-Red 1st AF Cathode
22	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. 1st AF Screen Dropping
23	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Plate Load
24	200KΩ	½		BTS-220K	Red-Blk.-Yl. Bleeder
25	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 2nd AF Grid
26	2200Ω	½		BTS-2200	Red-Red-Red 2nd AF Cathode
27	150KΩ	½		BTS-150K	Br.-Grn.-Yl. 2nd AF Plate Load
28	68KΩ	½		BTS-68K	Blue-Gray-Or. Decoupling
29	220Ω	1		BW-1-220	Red-Red-Br. Output Cathode
30	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Neon Coupling
31	470Ω	1		BTA-470	Yl.-Vi.-Br. Filter
32	470Ω	1		BTA-470	Yl.-Vi.-Br. "
33	10Ω	1		BW-1-10	Br.-Blk.-Blk. Input Volume Network-See Note

Note-Some models use two 20Ω resistors in parallel.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	RAULAND PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
34	117V AC @ .27A	400V CT @ .045A	6.2V CT @ 2.0A		LP-0172	P-6289	T22R00†	P-2950†

†Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	TURNS RATIO PRI. to SEC.	DC RES. PRI.	DC RES. SEC.	RAULAND PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
35	1 to 15	12CT	560Ω	LA-0043	A-4708‡	T20A00‡		‡Drill new mounting holes.

TRANSFORMER (INPUT)

ITEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	TURNS RATIO PRI. to SEC.	DC RES. PRI.	DC RES. SEC.	RAULAND PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
36	17 to 1 tapped @ 10 to 1	125Ω tapped @ 230Ω	3.9Ω	LO-0098				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	VC IMP.	RAULAND PART No.	JENSEN PART No.		
37	PM	50Ω	US-0012			
	CONE DIA.	VC DIA.				
38	3-3/8"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

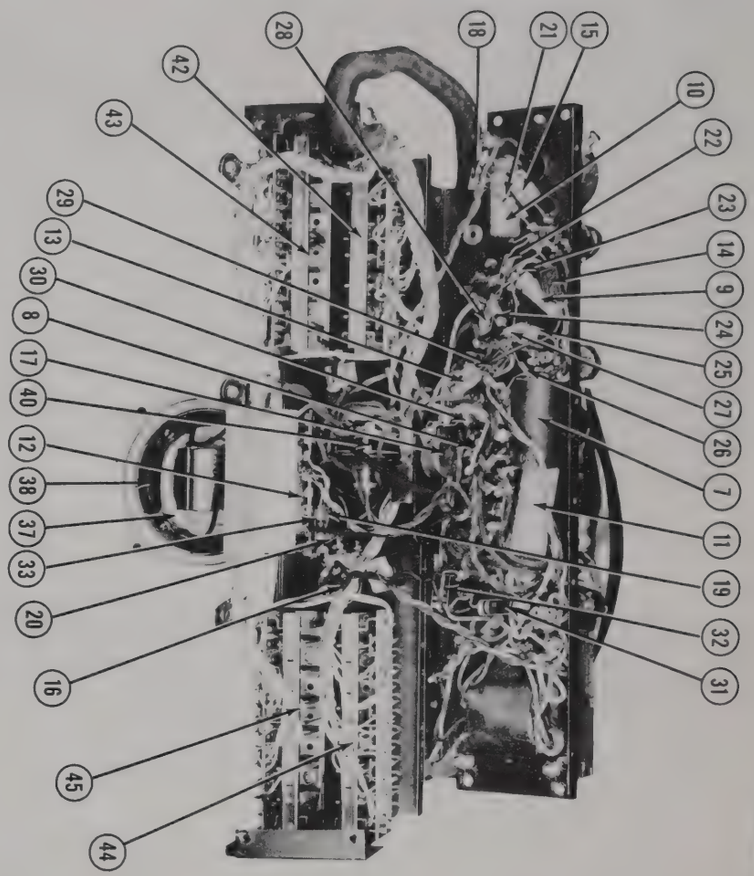
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					RAULAND PART No.		
39	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	RAULAND PART No.	NOTES
40	Switch	US-0012	Listen-Talk
41	"	X-0215	Cradle (H Models)
42	"		Pushbutton Assembly
43	"		" "
44	"		" "
45	"		" "
46	Neon Bulb		NE-45

CHASSIS—BOTTOM VIEW



INSTALLATION AND SERVICE NOTES

All circuit connections are made in the junction boxes. No circuit changes are made in the Amplicall units themselves.

The arrangement of button numbering is from left to right, first in the upper row, then in the same direction in the lower row. In order to make the buttons follow sequence given, the circuit numbers shown in Figure 1 must be observed.

Figure 2 is a detailed wiring diagram and color code for connecting the junction boxes. Each contact of the circuits used is wired in parallel with the corresponding contacts in all other junction boxes on the system.

To connect a given junction box so that an Amplicall unit plugged into it will respond to a certain number, for example #4, a pair of wires is run from the insulated tie lugs to the selected circuit in the junction box. In this case #4 circuit, which occupies pins number 1 and 2 of socket 2. An example of this is shown in Figure 1.

If a unit has been repaired and fails to operate when plugged into the junction box a check should be made for short circuits or opens in the junction boxes or cable network. Disconnect all units from their junction boxes. With a continuity meter test from each wire to all other wires and to ground for shorts. Checking from one junction box will check the eintire system for shorts since they are all in parallel. To check for opens it is convenient to make up a plug with the pins of each circuit shorted. By plugging it in the junction box at one end of the system, a continuity check of each circuit can be made at the other end of the line.

If excessive hum is experienced during operation, connect pin 8 of socket 2 in the junction box to a water pipe or a good ground connection.

If a unit fails to operate and the pilot light does not light, it is probable that the fuse has blown. On some units the fuse may blow the first time it is turned on due to the rush of current for re-forming the electrolytic capacitor. A new 1 amp. fuse should be installed. Blowing of several fuses is definite proof of a defect in the unit.

REMOVING CHASSIS FROM CABINET

The procedure is as follows:

1. Remove the three screws on the front panel of the amplifier.
2. Remove volume control knob by pulling directly away from the cabinet.
3. Remove the two large screws on the bottom of the Amplicall unit.
4. Press the talk-listen lever down and remove the front panel, easing the upper portion out from the cabinet so that the volume control shaft will clear its opening in the cabinet.
5. With the front panel removed, pull the chassis from the cabinet straight out and at the same time push on the multiple pair cables and AC cable from the back.
6. To reinstall the amplifier in the cabinet the procedure should be reversed.

Should it be necessary to completely remove the cabinet from the chassis and cable assembly such as in the replacement of a cabinet, the above procedure should be followed except that the metal cover on the lower back portion of the cabinet should be removed as well as the large screws holding the chassis to the cabinet. There is sufficient clearance in the cabinet to pass the junction plug and telephone handset.

REPLACING PILOT LIGHT

After the chassis has been removed from the cabinet the pilot light receptacle can be removed from the chassis by squeezing the holding snaps. The pilot light can then be replaced without the use of special tools.

DATE 2/46
SET #33
FOLDER #483-22
RAULAND 2400 SERIES AMPLICALLS
RAULAND 2400 SERIES AMPLICALLS

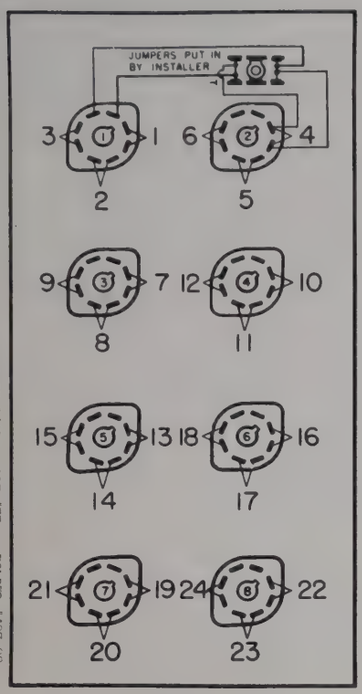


FIGURE 1

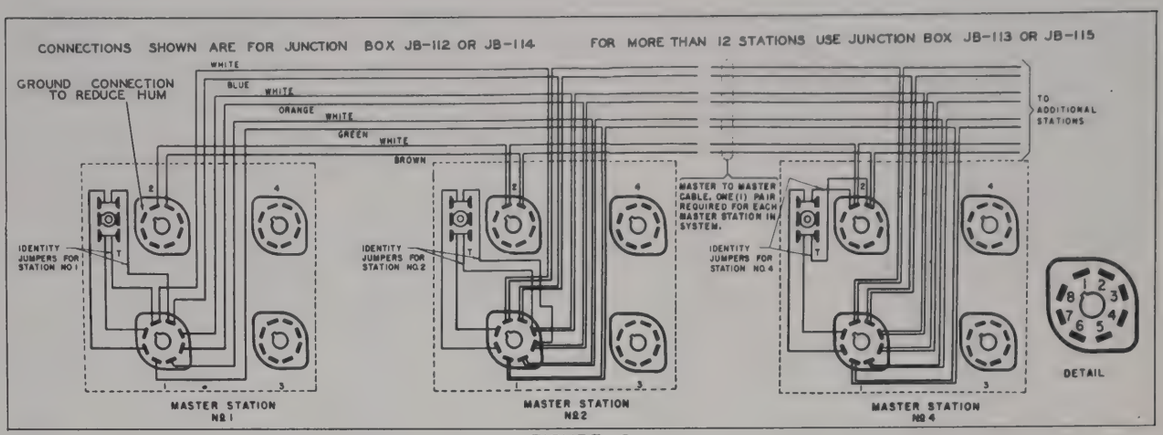
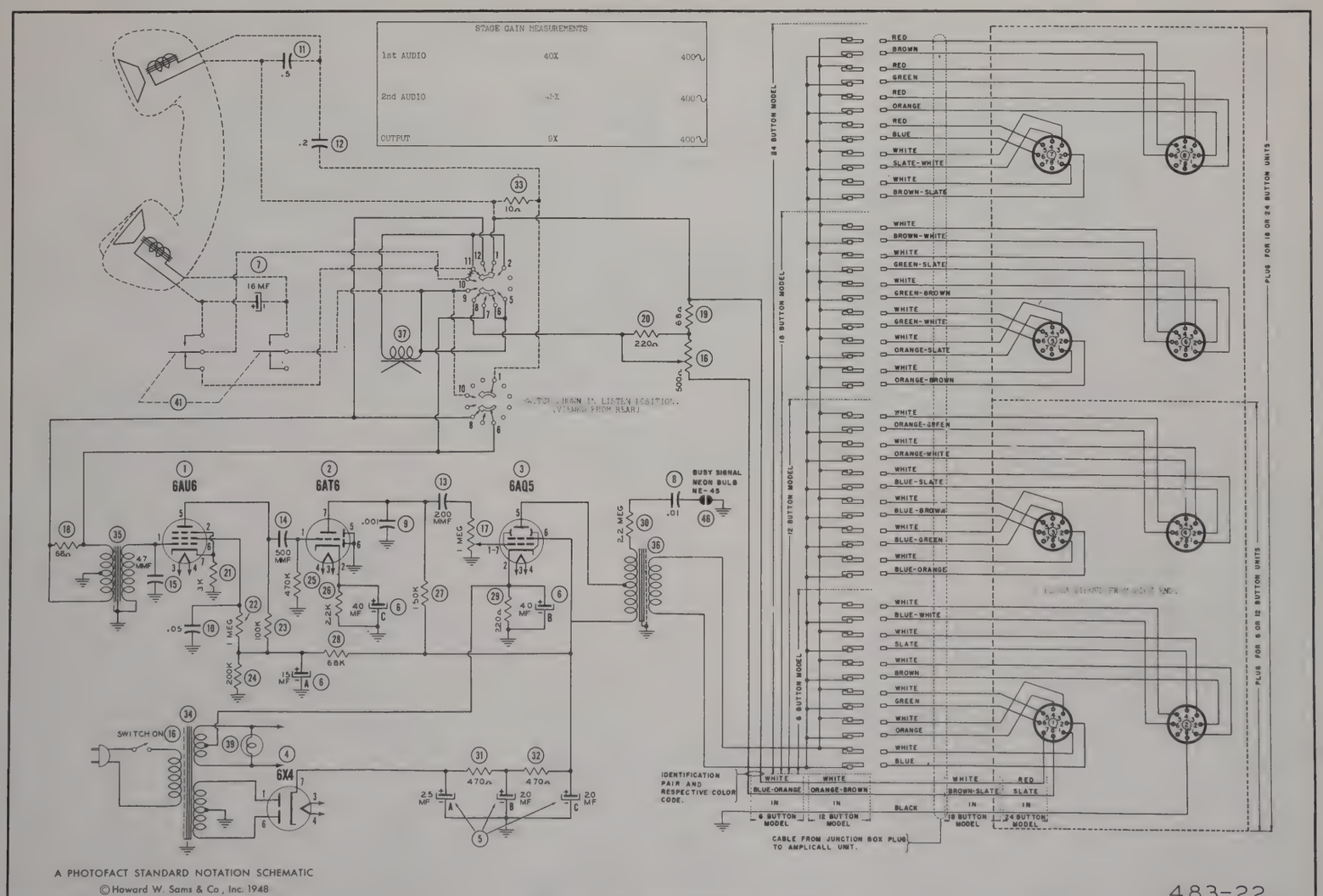


FIGURE 2

Pair No.	Color	Socket No.	Lug No.	Pair No.	Color	Socket No.	Lug No.	Pair No.	Color	Socket No.	Lug No.	Pair No.	Color	Socket No.	Lug No.
1	Blue - White	1	1 & 2	7	Blue Orange - White	3	1 & 2	13	Orange Brown - White	5	1 & 2	19	Brown Slate - White	7	1 & 2
2	Orange - White	1	3 & 4	8	Blue Green - White	3	3 & 4	14	Orange Slate - White	5	3 & 4	20	Slate White - White	7	3 & 4
3	Green - White	1	5 & 6	9	Blue Brown - White	3	5 & 6	15	Green White - White	5	5 & 6	21	Blue - Red	7	5 & 6
Spkr Identity pair		1	7 & 8	-	No connection	3	7 & 8	-	No connection	5	7 & 8	-	No connection	7	7 & 8
4	Brown - White	2	1 & 2	10	Blue Slate - White	4	1 & 2	16	Green Brown - White	6	1 & 2	22	Orange - Red	8	1 & 2
5	Slate - White	2	3 & 4	11	Orange White - White	4	3 & 4	17	Green Slate - White	6	3 & 4	23	Green - Red	8	3 & 4
6	Blue White - White	2	5 & 6	12	Orange Green - White	4	5 & 6	18	Brown White - White	6	5 & 6	24	Brown - Red	8	5 & 6
Gnd	No cable connection	2	8	-	No connection	4	7 & 8	-	No Connection	6	7 & 8	-	No Connection	8	7 & 8



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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483-22

SENTINEL MODELS
302-I, 302-T, 302-W

SENTINEL MODEL 302-I

TRADE NAME	Sentinel, Models 302-I, 302-T, 302-W
MANUFACTURER	Sentinel Radio Corp., 2100 W. Dempster St., Evanston, Ill.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12BA6 RF Amp., 12BE6 Converter, 12BA6 IF Amp., 12BA6 FM IF Amp., 12S8GT Det.-AVC-AF, 50B5 Power Output.
POWER SUPPLY	110-120 Volts AC-DC RATING .37 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1730KC FREQ. MOD. 87.5-109MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

The AM alignment should be done before FM alignment.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.2 MFD.	High side to front stator of tuning cap. Low side to chassis.	455KC	BC (counter clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	250MMFD	High side to terminal #2 of ant. term. strip. Low side to term. #3.	"	"	Tuning cap. fully closed	"	A5	Adjust for minimum output
3	250MMFD	"	1730KC	"	Tuning cap. fully open.	"	A6	Adjust for maximum output
4	250MMFD	"	1400KC	"	Tune for max-imum output.	"	A7	" " " "
5	250MMFD	"	600KC	"	"	"	A8	Rock tuning cap. and adjust A8 for maximum output. Repeat Steps 3, 4 & 5 until no further improvement can be made.

FOR FM ALIGNMENT SEE BACK PAGE

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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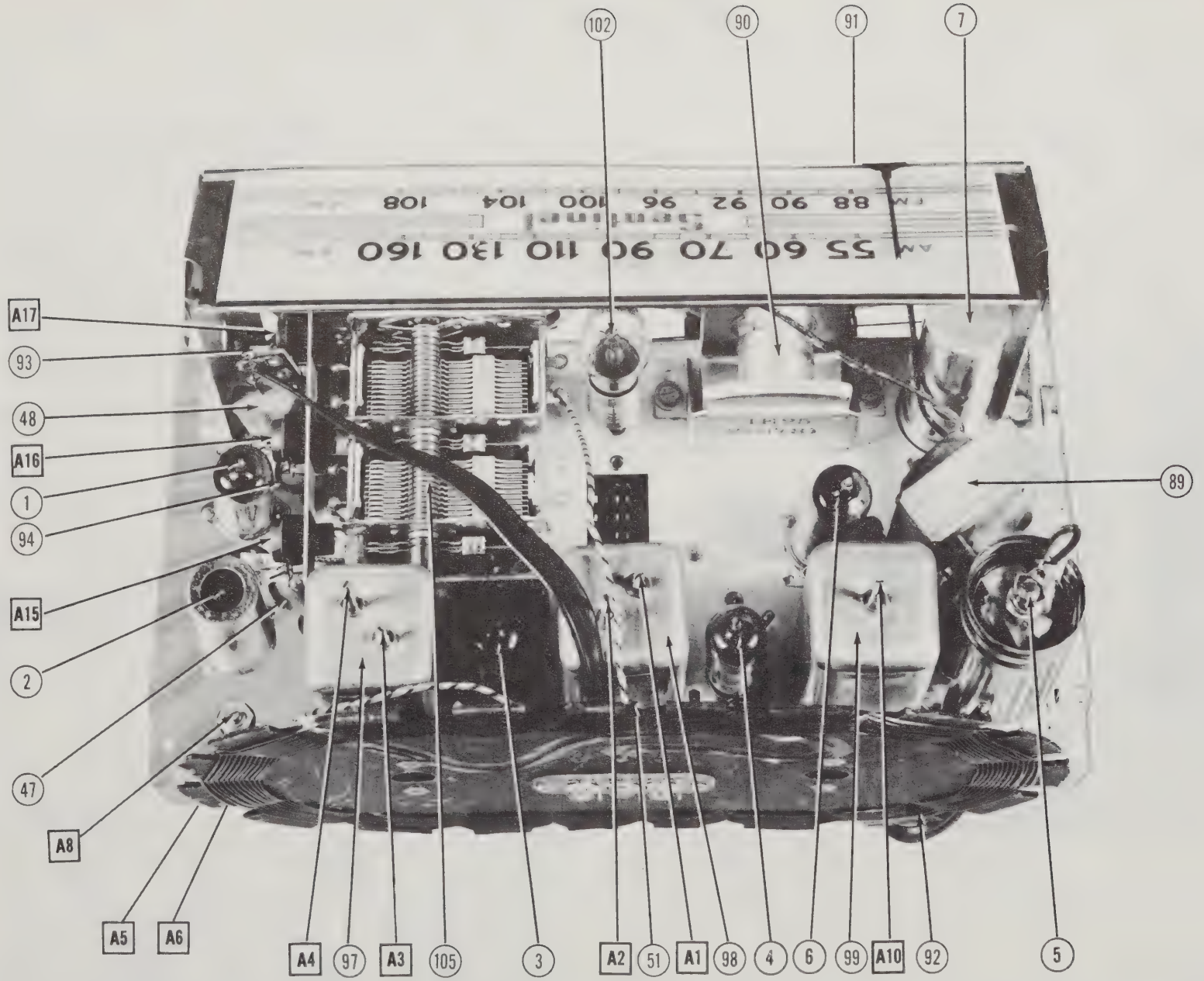
DATE 2/48 SET #33 FOLDER #483-2S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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	12BA6	12BA6	7BK	
2	Converter	12BE6	12BE6	7CH	
3	IF Amp.	12BA6	12BA6	7BK	
4	FM IF Amp.	12BA6	12BA6	7BK	
5	Det.-AVC-AF	12S8GT	12S8GT		
6	Power Output	50B5	50B5	7BJ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SENTINEL PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	50	150	25E22	DY-2x50-150	EL-25	AF1010D	UP5515	Filter
B	10	150		M-10-150	UT-121	PRS150-12	BR1215	"
C	50	150						"
8	20	25	25E3	M-25-25	TA-25	PRS25-25	BR202A	Cathode Bypass
9	4	50	25E23	M-4-450	UT-41	PRS150-4	BR415	Stabilizing Cap.
10	.05	400	23E416	MPH-4-05	TC-15	484-05	DT4S5	Line Filter
11	.05	200	23E2014-8	S-4-05	TC-15	484-05	DT2S5	Fil. Bypass
12	.02	300	23E213	S-4-02	TC-12	484-02	DT4S2	" "
13	.02	200	23E213	S-4-02	TC-12	484-02	DT2S2	" "
14	.005	400	23E408	S-6-005	TC-25	484-005	DT6D5	Output Plate Bypass
15	.002	400	23E2014-12	S-6-002	TC-22	484-002	DT6D2	Tone Compensation
16	.005	200	23E2014-3	S-6-005	TC-25	484-005	DT6D5	" "
17	.05	400	23E2014-8	S-4-05	TC-15	484-05	DT4S5	Audio Coupling
18	.2	200	23E2014-10	S-4-2	TC-2	484-.2	DT4P2	AF Plate Decoupling
19	.002	400	23E2014-12	S-6-002	TC-22	484-002	DT6D2	Audio Coupling
20	.05	200	23E2014-8	S-4-05	TC-15	484-05	DT2S5	" "
21	.002	400	23E2014-12	S-6-002	TC-22	484-002	DT6D2	De-emphasis
22	.01	200	23E2014-6	S-4-01	TC-11	484-01	DT2S1	2nd FM IF Plate Decoup.
23	.01	200	23E2014-6	S-4-01	TC-11	484-01	DT2S1	2nd FM IF Screen Bypass
24	.01	200	23E2014-6	S-4-01	TC-11	484-01	DT2S1	2nd FM IF Cathode Byp.
25	.01	200	23E2014-6	S-4-01	TC-11	484-01	DT2S1	AVC Filter
26	.01	200	23E2014-6	S-4-01	TC-11	484-01	DT2S1	1st IF Plate Decoup.
27	.05	200	23E2014-8	S-4-05	TC-15	484-05	DT2S5	RF Bypass Pwr. Supply
28	.01	200	23E2014-6	S-4-01	TC-11	484-01	DT2S1	1st IF Screen Bypass
29	.05	200	23E2014-8	S-4-05	TC-15	484-05	DT2S5	1st IF Cathode Bypass
30	.01	200	23E2014-6	S-4-01	TC-11	484-01	DT2S1	AVC Filter
31	.05	200	23E2014-8	S-4-05	TC-15	484-05	DT2S5	" "
32	.01	200	23E2014-6	S-4-01	TC-11	484-01	DT2S1	Conv. Plate Decoup.
33	.02	200	23E213	S-4-02	TC-12	484-02	DT2S2	Conv. Screen Bypass
34	.01	200	23E2014-6	S-4-01	TC-11	484-01	DT2S1	RF Screen Bypass
35	500	500	23E45	MO.5-35	1FM-35	1468-0005	5W5T5	Fil. Bypass
36	1500	500	23E2012-2	MW.5-215	1FM-215	1467-0015	1W5D15	" " - Cer.
37	500	500	23E45	MO.5-35	1FM-35	1468-0005	5W5T15	" "
38	250	500	23E42	MO.5-325	1FM-325	1468-00025	5W5T25	AF Plate Bypass
39	250	500	23E42	MO.5-325	1FM-325	1468-00025	5W5T25	Diode Load Cap.
40	50	500	23E2009-5	MO.5-45	1FM-45	1468-00005	5W5Q5	Diode RF Filter-Cer.
41	50	500	23E2009-5	MO.5-45	1FM-45	1468-00005	5W5Q5	" " " "
42	25	500	23E16	MO.5-425	1FM-425	1468-000025	5W5J25	Osc. Grid Cap.-Cer.
43A	25	500	23E2019	MO.5-425	1FM-425	1468-000025	5W5J25	RF Coupling-Cer.
B	15	500		MO.5-41	MS-415	1468-00001	5W5Q1	" " "
44	250	500	23E42	MO.5-325	1FM-325	1468-00025	5W5T25	" "
45	100	500	23E11	MO.5-31	1FM-31	1468-0001	5W5T1	RF Cathode Bypass-Cer.
46	50	500	23E2009-5	MO.5-45	1FM-45	1468-00005	5W5Q5	RF Coupling
47	10	500	23E15	MOS.5-41	MS-41	1469-00001	5R5Q1	Fixed Trimmer
48	2000	500	23E52	MW.5-22	1FM-22	1467-002	1W5D2	Ext. Ant. Isolation

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
49	2 Meg.	½	28E23			Volume Control tapped @ 1.5 Meg.
50A	500KΩ	½	28E22	D13-133	AM-60-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 50A per instructions
C	Switch		" "	41	SW-A	" " " " "

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	IRC PART No.	IDENTIFICATION CODES
51	220KΩ	½	27E224	BTS-220K	Red-Red-Yl. Antenna Isolation
52	2.2 Meg.	½	27E225	BTS-2.2 Meg.	Red-Red-Grn. RF Grid
53	68Ω	½	27E680	BW-½-68	Blue-Gray-Blk. RF Cathode
54	2200Ω	½	27E222	BTS-2200	Red-Red-Red RF Screen Dropping
55	6800Ω	½	27E682	BTS-6800	Blue-Gray-Red RF Plate
56	2.2 Meg.	½	27E225	BTS-2.2 Meg.	Red-Red-Grn. Converter Grid
57	100KΩ	½	27E104	BTS-100K	Br.-Blk.-Yl. Converter Grid
58	10Ω	½	27E100	BW-½-10	Br.-Blk.-Blk. Parasitic Suppressor
59	22KΩ	½	27E223	BTS-22K	Red-Red-Or. Oscillator Grid
60	1000Ω	½	27E102	BTS-1000	Br.-Blk.-Red Converter Screen Dropping
61	470Ω	½	27E471	BTS-470	Yl.-Vi.-Br. Converter Plate Decoupling
62	470KΩ	½	27E474	BTS-470K	Yl.-Vi.-Yl. AVC Network
63	1000Ω	½	27E102	BTS-1000	Br.-Blk.-Red Parasitic Suppressor
64	1 Meg.	½	27E105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
65	68Ω	½	27E680	BW-½-68	Blue-Gray-Blk. 1st IF Cathode
66	2200Ω	½	27E222	BTS-2200	Red-Red-Red 1st IF Screen Dropping
67	470Ω	½	27E471	BTS-470	Yl.-Vi.-Br. 1st IF Plate Decoupling
68	100KΩ	½	27E104	BTS-100K	Br.-Blk.-Yl. 2nd IF Transformer Shunt-See Note 1
69	100KΩ	½	27E104	BTS-100K	Br.-Blk.-Yl. 2nd IF Transformer Shunt-See Note 1
70	22KΩ	½	27E223	BTS-22K	Red-Red-Or. 2nd IF Grid Filter - See Note 2
71	2.2 Meg.	½	27E225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
72	2.2 Meg.	½	27E225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
73	470KΩ	½	27E474	BTS-470K	Yl.-Vi.-Yl. Diode Load
74	68KΩ	½	27E683	BTS-68K	Blue-Gray-Or. Diode RF Filter
75	68Ω	½	27E680	BW-½-68	Blue-Gray-Blk. 2nd IF Cathode
76	2200Ω	½	27E222	BTS-2200	Red-Red-Red 2nd IF Screen Dropping
77	470Ω	½	27E471	BTS-470	Yl.-Vi.-Br. 2nd IF Plate Decoupling
78	39KΩ	½	27E393	BTS-39K	Or.-White-Or. De-emphasis
79	1 Meg.	½	27E105	BTS-1 Meg.	Br.-Blk.-Grn. Detector Load
80	22KΩ	½	27E223	BTS-22K	Red-Red-Or. Ratio Detector Diode Load
81	68KΩ	½	27E683	BTS-68K	Blue-Gray-Or. Tone Compensation
82	10 Meg.	½	27E106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
83	470KΩ	½	27E474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
84	220KΩ	½	27E224	BTS-220K	Red-Red-Yl. AF Plate Decoupling
85	470KΩ	½	27E474	BTS-470K	Yl.-Vi.-Yl. Output Grid
86	180Ω	½	27E181-2	BW-½-180	Br.-Gray-Br. Output Cathode
87	33Ω	1	27E330-3	BW-1-33	Or.-Or.-Blk. Surge Limiter

Note 1-Not used in all models.
Note 2-Some models use 1 Meg. in this application with return to AVC line. Replacement same as #64.

FILTER CHOKE

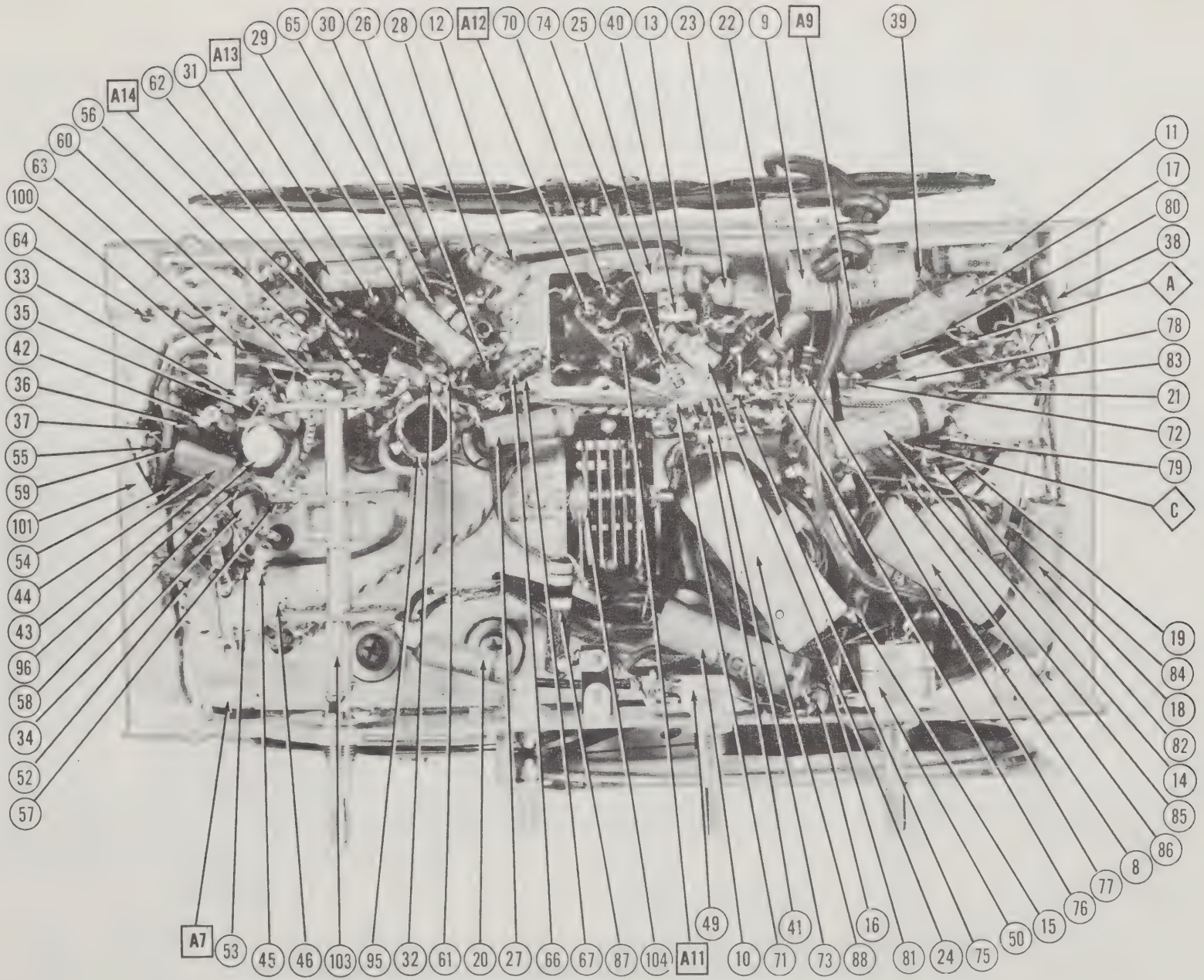
ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: SENTINEL PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	INSTALLATION NOTES
88A	.094A	100Ω	1.4 Henries	22E21				
B	.052A	250Ω	1.5 Henries					

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SENTINEL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
89	3600Ω	3.3Ω	275Ω	.7Ω	22E20	A-3650	T23S46	A-2023	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: SENTINEL PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.				
90	PM	3.3Ω	1E25			
	CONE DIA.	VC DIA.				
91	4"x6"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			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PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

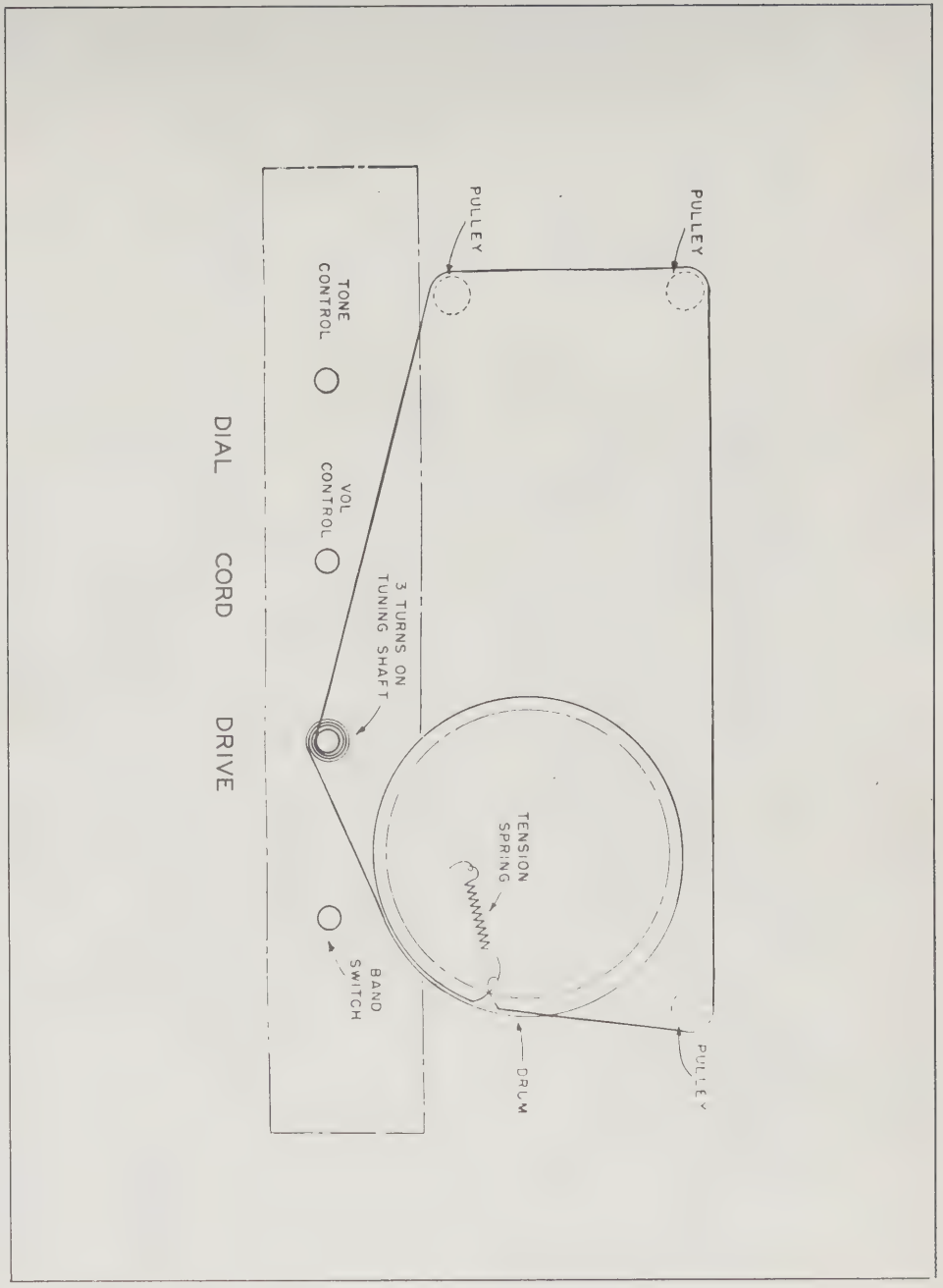
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA SENTINEL PART No.	REPLACEMENT DATA MEISSNER PART No.	
92	Loop Ant.	.1Ω	1Ω	20E242		
93	FM Ant.Coil	.3Ω	0Ω	2E53		
94	FM RF Coil		0Ω	2E54		
95	AM Osc.Coil		6.5Ω	20E238	14-1040	
96	FM Osc.Coil		0Ω	2E51		
97A	AM Input IF	8Ω	8Ω	20E214		97A & B in same can.
B	FM " "	.5Ω	.5Ω			
98A	AM OutputIF	8Ω	8Ω	20E215		98A & B in same can.
B	FM " "	.5Ω	.5Ω			
99	Disc. Trans	.5Ω	.1Ω	20E215		
100	Wave Trap		57Ω	2E19		
101	RF Choke		.2Ω	2E47		

DIAL LIGHT

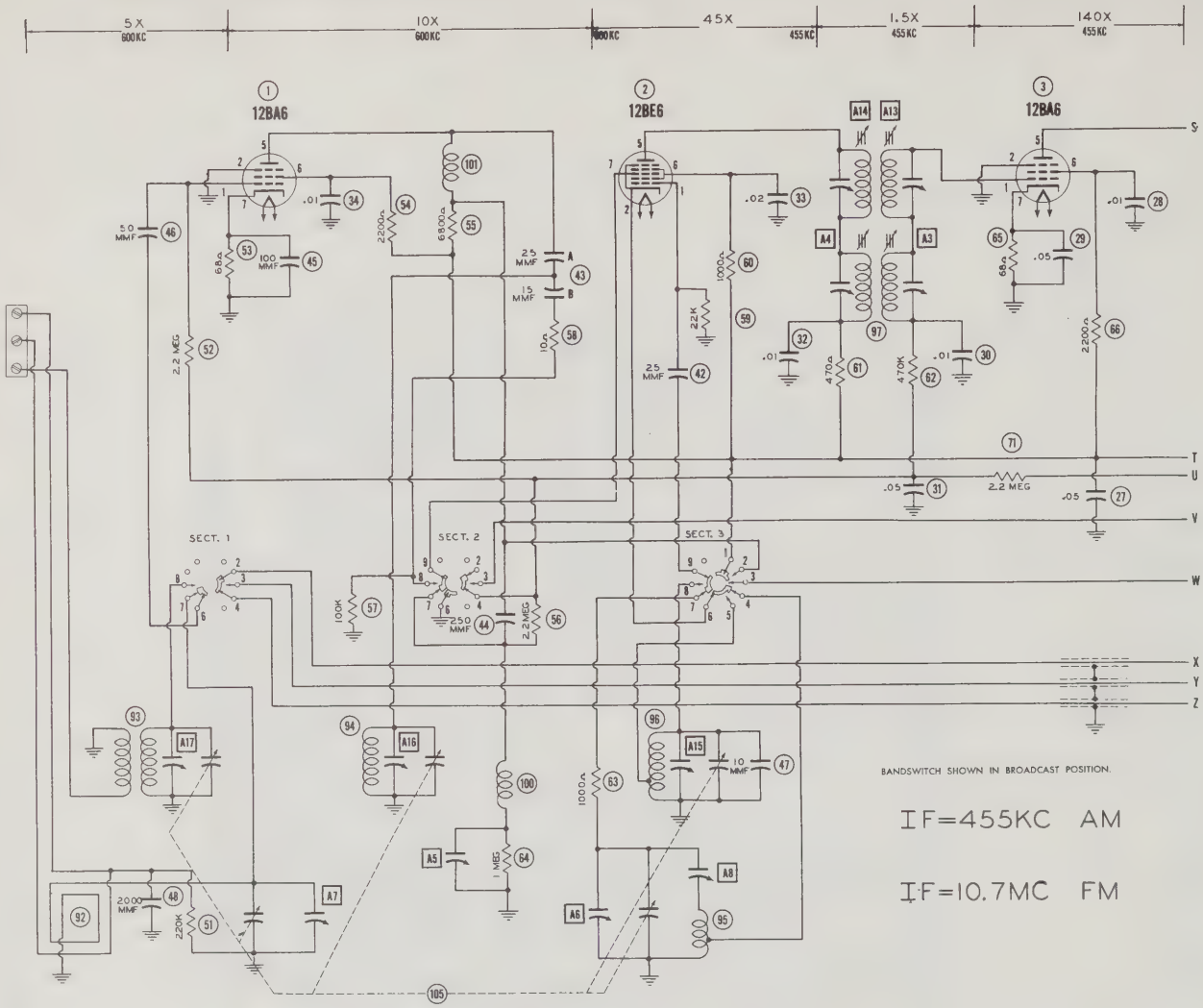
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA SENTINEL PART No.	REPLACEMENT DATA	INSTALLATION NOTES
102	Bayonet	110-125			40E5		

MISCELLANEOUS

ITEM No.	PART NAME	SENTINEL PART No.	NOTES
103	Switch	29E15	Band
104	Rectifier	57E1	Selenium
105	2 Gang Var. Cap.	24E30	(15-517MMF) each section
A5	Trimmer Strip	24E29	Wave Trap Adj.
A6			BC Osc. Adj.
A7	Trimmer	24E3	BC Ant. Adj.
A8	Padder	24E16	BC Osc. Adj.
A15	Trimmer	24E28	FM Osc. Adj.
A16	"	24E26	FM RF Adj.
A17	"	24E28	FM Ant. Adj.
	Dial Pointer	35E8-2	
	Dial Scale	36E30	



DATE 2/48 S3T #33 FOLDER #462-23



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
	1	12BA6	0V.	0V.	44VAC	30VAC	107VDC	95VDC	1.1VDC	-	-
	2A	12BE6	-5.5VDC§	0V.	30VAC	15VAC	116VDC	110VDC	0V.	-	-
‡	2B	12BE6	-5VDC§	0V.	30VAC	15VAC	110VDC	100VDC	-.6VDC	-	-
	3	12BA6	0V.	0V.	44VAC	55VAC	110VDC	107VDC	1VDC	-	-
‡	4	12BA6	0V.	0V.	55VAC	67VAC	107VDC	100VDC	1.2VDC	-	-
	5	12S8GT	-.6VDC	0V.	-.4VDC	-.2VDC	-.2VDC	48VDC	15VAC	0V.	-.4VDC
	6	50B5	0V.	8.6VDC	117VAC	67VAC	120VDC	117VDC	0V.	-	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

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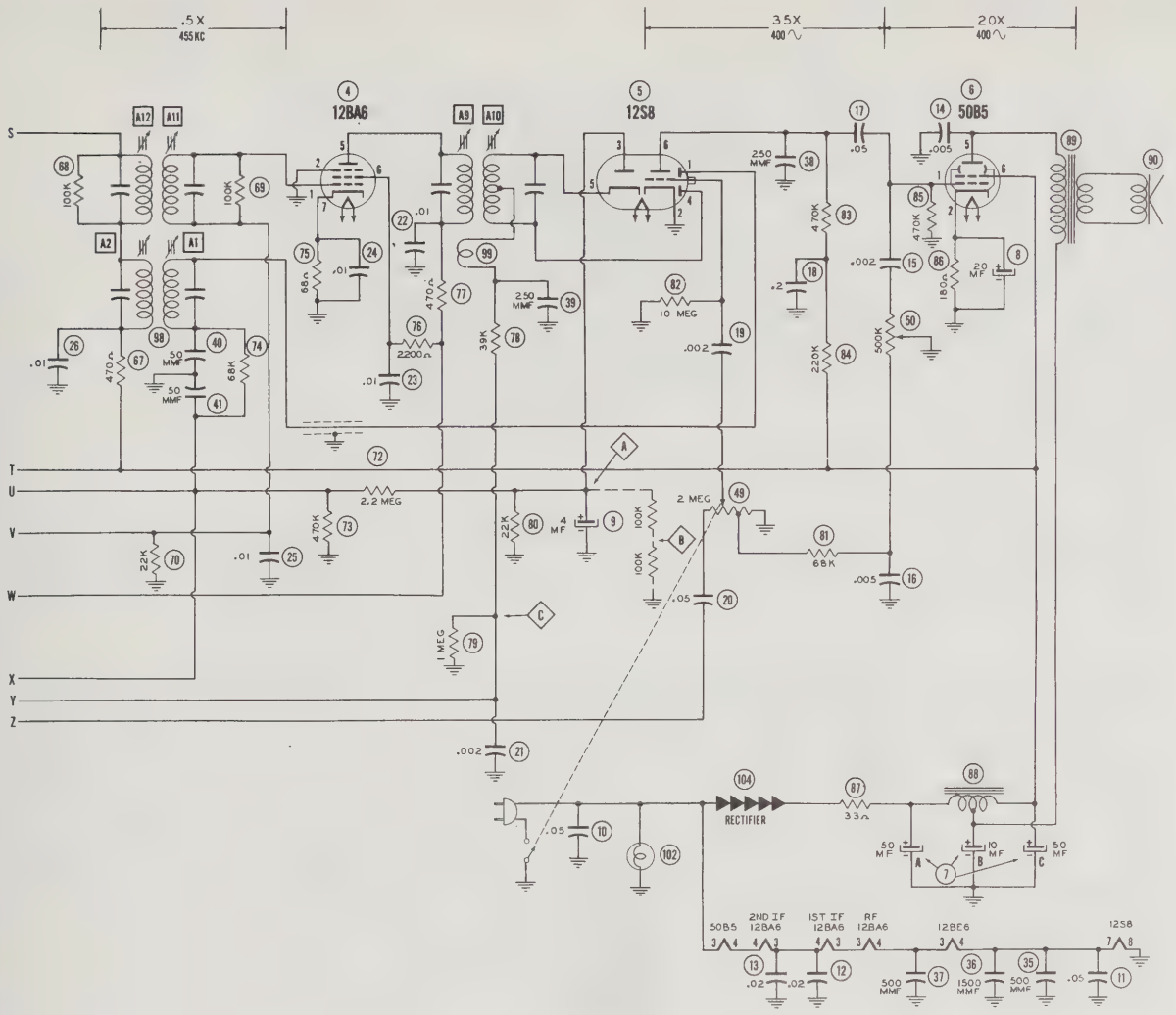
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
	1	12BA6	4 Meg.	0Ω	35Ω	25Ω	32KΩ	27KΩ	68Ω	-	-
	2A	12BE6	21KΩ	.7Ω	25Ω	13Ω	25KΩ	26KΩ	800KΩ	-	-
‡	2B	12BE6	21KΩ	0Ω	25Ω	13Ω	30KΩ	34KΩ	110KΩ	-	-
	3	12BA6	2 Meg.	0Ω	35Ω	40Ω	25KΩ	27KΩ	70Ω	-	-
‡	4	12BA6	23KΩ	0Ω	40Ω	48Ω	25KΩ	27KΩ	70Ω	-	-
	5	12S8GT	440KΩ	0Ω	20KΩ	1 Meg.	1 Meg.	700KΩ	13Ω	0Ω	10 Meg.
	6	50B5	500KΩ	250Ω	70Ω	48Ω	25KΩ	25KΩ	500KΩ	-	-

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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483-23

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator. In Step 7 connect 2 100KΩ resistors (within 1% of each other) in series from Point A to chassis. The junction of these two resistors is Point B. (See schematic).

To check accuracy of adjustments in Step 8 proceed as follows: Attenuate output of signal generator for a meter reading of 4 volts at exactly 10.7MC Tune signal generator below 10.7MC until meter reads 2 volts and note the freq. at which this occurs. Tune signal generator above 10.7MC until meter reads 2 volts and note frequency at which this occurs. The number of KC difference from 10.7MC on either side of 10.7MC should be approximately the same. A slight difference is not serious, however if one side is twice the other, or if a double peak occurs then A11, A12, A13,& A14 should be readjusted and rechecked. Once the FM IF alignment is complete the AM alignment should be rechecked.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	.002 MFD	High side to Pin 1 (grid) 12BA6 2nd IF Tube (4). Low side to chassis.	10.7MC (unmodulated)	FM (clockwise)	Tuning cap. fully open.	DC probe to Point A. Common to chassis	A9	Adjust for maximum deflection.
7	.002 MFD	"	10.7MC 400∿ modulation)	"	"	DC probe to Point C. Common to Point B. (see prealignment notes)	A10	Adjust for zero deflection
8	.002 MFD	High side to Pin 7 (grid) 12BE6. Low side to chassis.	10.7MC (unmodulated)	"	"	DC probe to Point A. Common to chassis	A11,A12 A13,A14	Adjust for maximum deflection. Attenuate sig. gen. output to maintain meter reading of 2-4 volts. Check accuracy of these adjustment per prealignment notes. Continue with FM RF alignment Step 9.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal 60∿ modulation with 450KC sweep.
Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6	.002 MFD	High side to Pin 1 (grid) 12BA6 1st IF Tube (3). Low side to chassis.	10.7MC (freq. modulated)	FM (clockwise)	Tuning cap. fully open.	Vertical input to Point A. Ground to chassis.	A9,A11 A12	Disconnect 4 MFD cap. from Point A. Adjust A9, A11, A12 for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
7	.002 MFD	High side to Pin 7 (grid) 12BE6. Low side to chassis.	"	"	"	"	A13, A14	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
8	.002MFD	High side to Pin 1 (grid) 12BA6 1st IF Tube (3). Low side to chassis.	"	"	"	Vertical input to Point C. Ground to chassis.	A10	Reconnect 4 MFD cap. to Point A. Adjust A10 for maximum straightness of crossover lines with crossover occurring at center of pattern, per Fig. 2. Continue with FM RF alignment.

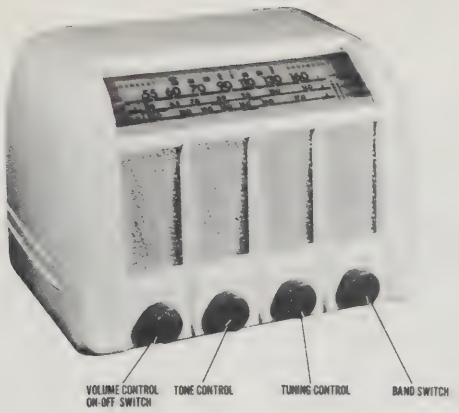
FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	5ft. 300 Ω transmission line.	Connect sig. gen. to 300Ω transmission line. Connect other end of transmission line to terminals 1 & 3 of ant. terminal strip.	108MC (unmodulated)	FM	108MC	DC probe to Point A. Common to chassis	A15	Adjust for maximum deflection.
10	"	"	104MC	"	Tune for maximum deflection.	"	A16, A17	"

FIG. 1

FIG. 2

FOR AM ALIGNMENT SEE FRONT PAGE



SENTINEL MODEL 305-I

TRADE NAME	Sentinel, Models 305-I, 305-I-3, 305-W, 305-W3
MANUFACTURER	Sentinel Radio Corp., 2100 W. Dempster St., Evanston, Ill.
TYPE SET	AC-DC Operated Multi-Band Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12BA6 RF Amp., 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 35B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
RATING	.30 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	528-1650KC
SHORT WAVE	5.9-11.0MC, 10.8-17.3MC, 17.2-24.2MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.02 MFD	High side to rear stator plates of tuning cap. Low side to chassis.	455KC	BC (fully clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.02 MFD	High side to Pin 1 (grid) 12BA6. Low side to chassis.	"	"	Tuning cap. fully closed	"	A5	Adjust for minimum output
3	250MMFD	High side to ext. ant. lead. Low side to chassis.	1650KC	"	Tuning cap. fully open.	"	A6	Adjust for maximum output
4	250MMFD	"	1400KC	"	Tune for maximum output.	"	A7	" " " "
5	250MMFD	"	600KC	"	"	"	A8	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made.
6	400Ω carbon res.	"	11.0MC	SW 1 (one position counter-clock-wise)	Tuning cap. fully open.	"	A9	Adjust for maximum output
7	"	"	10.5MC	"	Tune for maximum output.	"	A10	Rock tuning cap. and adjust for maximum output.
8	"	"	17.3MC	SW 2 (2 positions counter-clock-wise)	Tuning cap. fully open.	"	A11	Adjust for maximum output
9	"	"	16.5MC	"	Tune for maximum output.	"	A12	Adjust for maximum output
10	"	"	24.2MC	SW 3 (fully counter-clock-wise)	Tuning cap. fully open.	"	A13	" " " "
11	"	"	23.5MC	"	Tune for maximum output.	"	A14	" " " "

SENTINEL MODELS 305-I, 305-I-3, 305-W, 305-W3

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DATE 2/48 SET #33 FOLDER #483-24

PARTS LIST AND DESCRIPTIONS

SENTINEL MODELS 300-I, 305-I-3, 305-W, 305-W3

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	12BA6	12BA6	7BK	
2	Converter	12BE6	12BE6	7CH	
3	IF Amp.	12BA6	12BA6	7BK	
4	Det.-AVC-AF	12AT6	12AT6	7BT	
5	Power Output	35B5	35B5	7BZ	
6	Rectifier	35W4	35W4	5B$_4$	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SENTINEL PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	50	150	25E1	DY-2x50-150	EL-25	AF1010D	UP5515	■ Filter
B	50	150						▲ "
8	.05	400	23E2013-3	MPH-4-05	TC-15	484-05	DT4S5	Line Filter
9	.05	400	23E2013-3	S-4-05	TC-15	484-05	DT4S5	Feedback
10	.01	400	23E2013-2	S-4-01	TC-11	484-01	DT4S1	Output Plate Bypass
11	.01	400	23E2013-2	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
12	.003	600	23E2013	S-6-003	TC-23	684-003	DT6D3	Tone Comp.
13	.1	400	23E2013-4	S-4-1	TC-1	484-.1	DT4P1	" "
14	.01	400	23E2013-2	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
15	.05	400	23E2013-3	S-4-05	TC-15	484-05	DT4S5	AVC Filter
16	.01	400	23E2013-2	S-4-01	TC-11	484-01	DT4S1	" "
17	.05	400	23E2013-3	S-4-05	TC-15	484-05	DT4S5	Decoupling
18	.003	600	23E2013	S-6-003	TC-23	684-003	DT6D3	Ext. Ant. Isolation
19	100		23E68	MO.5-31	1FM-31	1468-0001	5W5T1	AF Plate Bypass
20	100		23E68	MO.5-31	1FM-31	1468-0001	5W5T1	Diode RF Filter
21	100		23E68	MO.5-31	1FM-31	1468-0001	5W5T1	Osc. Grid Cap.
22	100		23E68	MO.5-31	1FM-31	1468-0001	5W5T1	RF Coupling
23	25		23E26	MO.5-425	1FM-425	1468-000025	5W5Q25	Fixed Trimmer Cer.
24	50		23E65	MO.5-45	1FM-45	1468-00005	5W5Q5	Fixed Trimmer
25	25		23E26	MO.5-425	1FM-425	1468-000025	5W5Q25	Fixed Trimmer Cer.
26	100		23E68	MO.5-31	1FM-31	1468-0001	5W5T1	RF Coupling

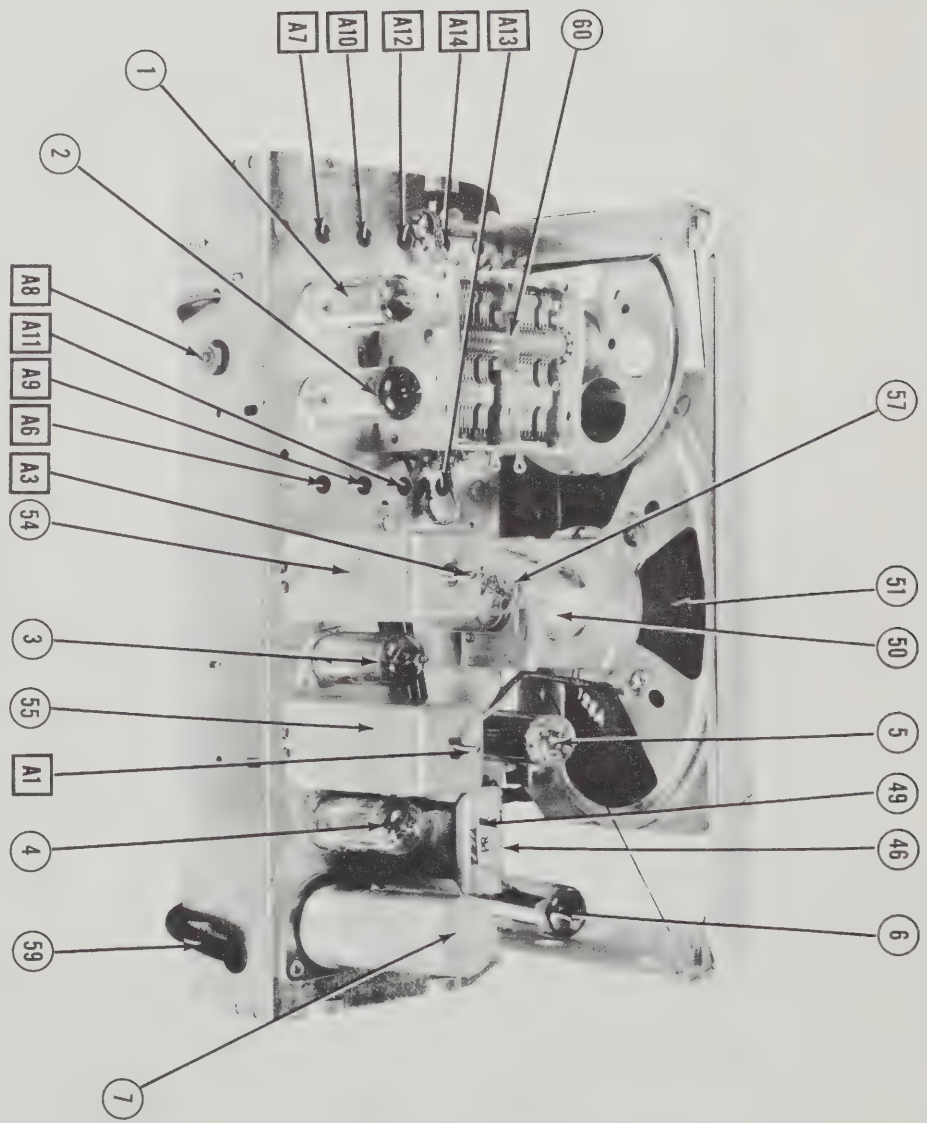
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
27	500KΩ	½	28E26			Volume Control tapped @ 5KΩ
28A	500KΩ	½	28B25	D13-133	AM-60-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 28A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	IRC PART No.	IDENTIFICATION CODES
29	330KΩ	1/3	27E334	BTS-330K	Or.-Or.-Yl. RF Grid
30	4700Ω	1/3	27E472	BTS-4700	Yl.-Vi.-Red RF Plate Load
31	220KΩ	1/3	27E224	BTS-220K	Red-Red-Yl. Converter Grid
32	22KΩ	1/3	27E223	BTS-22K	Red-Red-Or. Oscillator Grid
33	180Ω	1/3	27E181	BW-½-180	Br.-Gray-Br. Parasitic Suppressor
34	3.3 Meg.	1/3	27E335	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
35	3.3 Meg.	1/3	27E335	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
36	3.3 Meg.	1/3	27E335	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
37	1500Ω	1/2	27E152-2	BTS-1500	Br.-Grn.-Red Decoupling
38	68Ω	1/3	27E680	BW-½-68	Blue-Gray-Blk. IF Cathode
39	68KΩ	1/3	27E683	BTS-68K	Blue-Gray-Or. Diode RF Filter
40	4700Ω	1/3	27E472	BTS-4700	Yl.-Vi.-Red Tone Compensation
41	3.3 Meg.	1/3	27E335	BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
42	330KΩ	1/3	27E334	BTS-330K	Or.-Or.-Yl. AF Plate Load
43	470KΩ	1/3	27E474	BTS-470K	Yl.-Vi.-Yl. Output Grid
44	150Ω	1/2	27E151-2	BW-½-150	Br.-Grn.-Br. Output Cathode
45	10KΩ	1/3	27E103	BTS-10K	Br.-Blk.-Or. Tone Compensation
46	22KΩ	1/3	27E223	BTS-22K	Red-Red-Or. Tone Compensation
47	1000Ω	1	27E102-3	BTA-1000	Br.-Blk.-Red Filter
48	47Ω	1/2	27E470-2	BW-½-47	Yl.-Vi.-Blk. Surge Limiter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SENTINEL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
49	3100Ω	3.9Ω	215Ω tapped @ 10Ω	.6Ω	22E22	A-3856*		A-2900*	*Drill one new mounting hole and add extra filter to reduce hum level.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SENTINEL PART No.	JENSEN PART No.		
	FIELD	VC IMP.				
50	PM	3.9Ω	1E26			
	CONE DIA.	VC DIA.				
51	4"x6"	1/2"	CONE HAD SPECIAL ADJUSTMENT FEATURE -ORDER FROM MANUFACTURER			

R F COILS

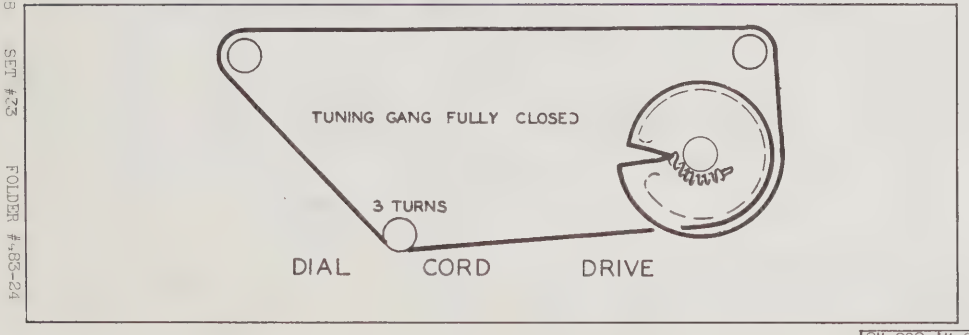
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SENTINEL PART No.	MEISSNER PART No.	
52A	Ant. Coil	18.5Ω	2.9Ω	20E251		Band 1
B	" "	.1Ω				Band 2
C	" "	.1Ω				Band 3
D	" "	.8Ω	.1Ω			Band 4
53A	Osc. Coil		11.1Ω	20E252		Band 1 Tapped at .5Ω
B	" "		.1Ω			Band 2
C	" "		.1Ω			Band 3
D	" "		.2Ω			Band 4 Tapped at .1Ω
54	Input IF	16.9Ω	15Ω	20E250	16-6666	
55	Output IF	16.9Ω	15Ω	20E250	16-6667	
56	RF Choke		50Ω	2E19		

DIAL LIGHT

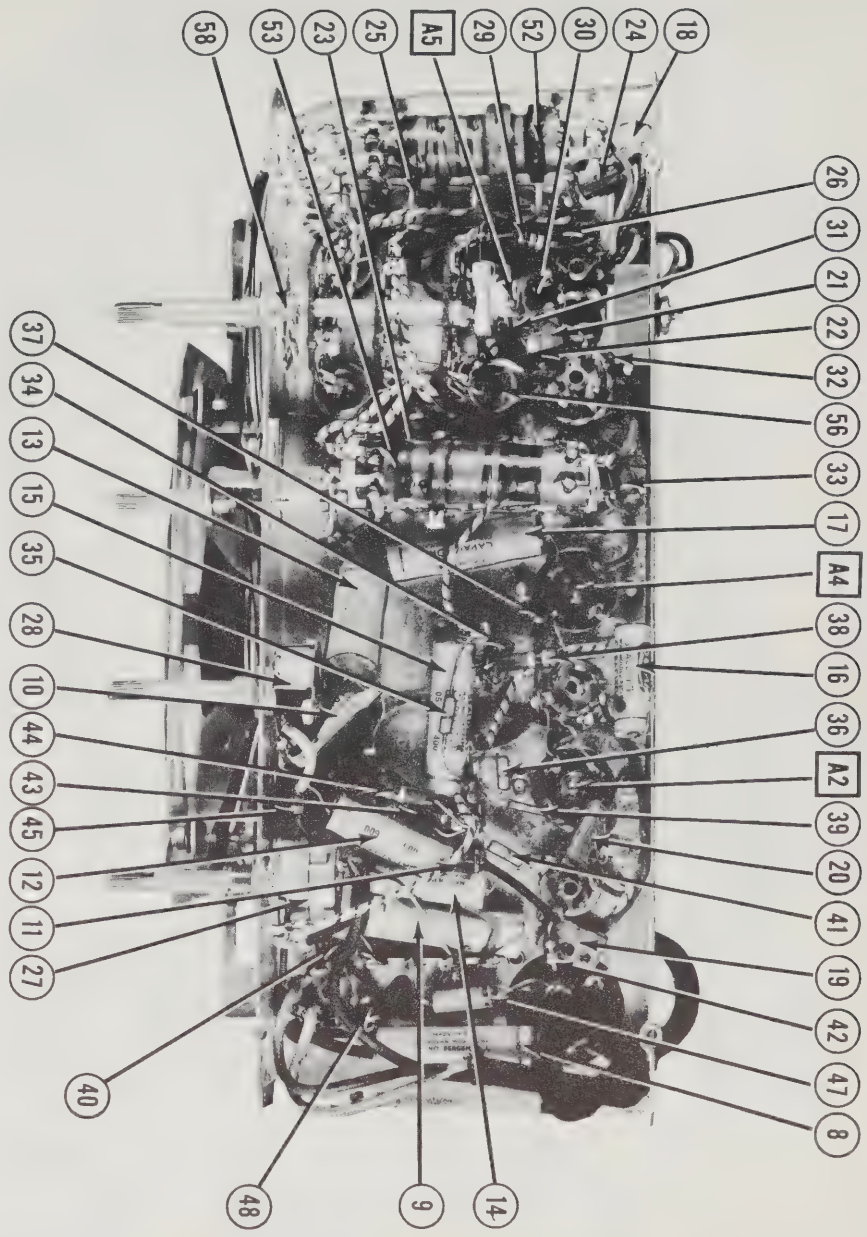
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					SENTINEL PART No.		
57	Bayonet	115			40E5		Type C-7

MISCELLANEOUS

ITEM No.	PART NAME	SENTINEL PART No.	NOTES
58	Switch	29E16	Band
59	Line Cord		For 230 Volt Operation
60	2 Gang Var. Ca...	24E32	(15-366MMF) each section
	Trimmer Strip	24E31	A6, A9, A11, A13
	" "	24E31	A7, A10, A12, A14
A5	Trimmer	24E33	IF Wave Trap Adj.
A8	Padder	24E16	BC Osc. Adj.
	Dial Scale	20E241-2	
	Dial Pointer	35E3	

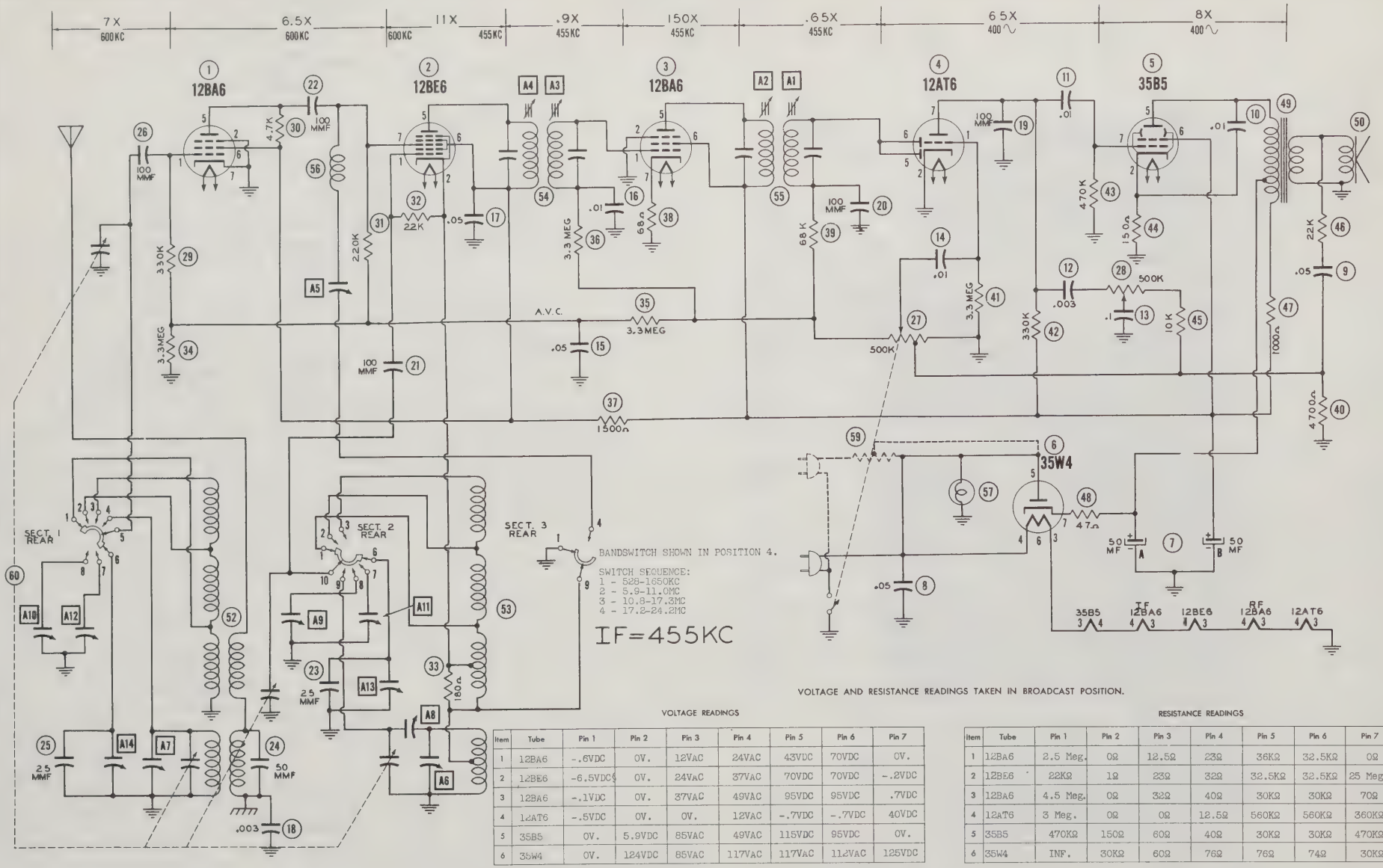


CHASSIS—BOTTOM VIEW



SENTINEL MODELS 205-I, 205-I-2, 205-W, 205-W2

SENTINEL MODELS 205-I, 205-I-2, 205-W, 205-W2



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BA6	-.6VDC	0V.	12VAC	24VAC	43VDC	70VDC	0V.
2	12BE6	-6.5VDC§	0V.	24VAC	37VAC	70VDC	70VDC	-.2VDC
3	12BA6	-.1VDC	0V.	37VAC	49VAC	95VDC	95VDC	.7VDC
4	12AT6	-.5VDC	0V.	0V.	12VAC	-.7VDC	-.7VDC	40VDC
5	35B5	0V.	5.9VDC	85VAC	49VAC	115VDC	95VDC	0V.
6	35W4	0V.	124VDC	85VAC	117VAC	117VAC	112VAC	125VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BA6	2.5 Meg.	0Ω	12.5Ω	23Ω	36KΩ	32.5KΩ	0Ω
2	12BE6	22KΩ	1Ω	23Ω	32Ω	32.5KΩ	32.5KΩ	25 Meg.
3	12BA6	4.5 Meg.	0Ω	32Ω	40Ω	30KΩ	30KΩ	70Ω
4	12AT6	3 Meg.	0Ω	0Ω	12.5Ω	560KΩ	560KΩ	360KΩ
5	35B5	470KΩ	150Ω	60Ω	40Ω	30KΩ	30KΩ	470KΩ
6	35W4	INF.	30KΩ	60Ω	76Ω	76Ω	74Ω	30KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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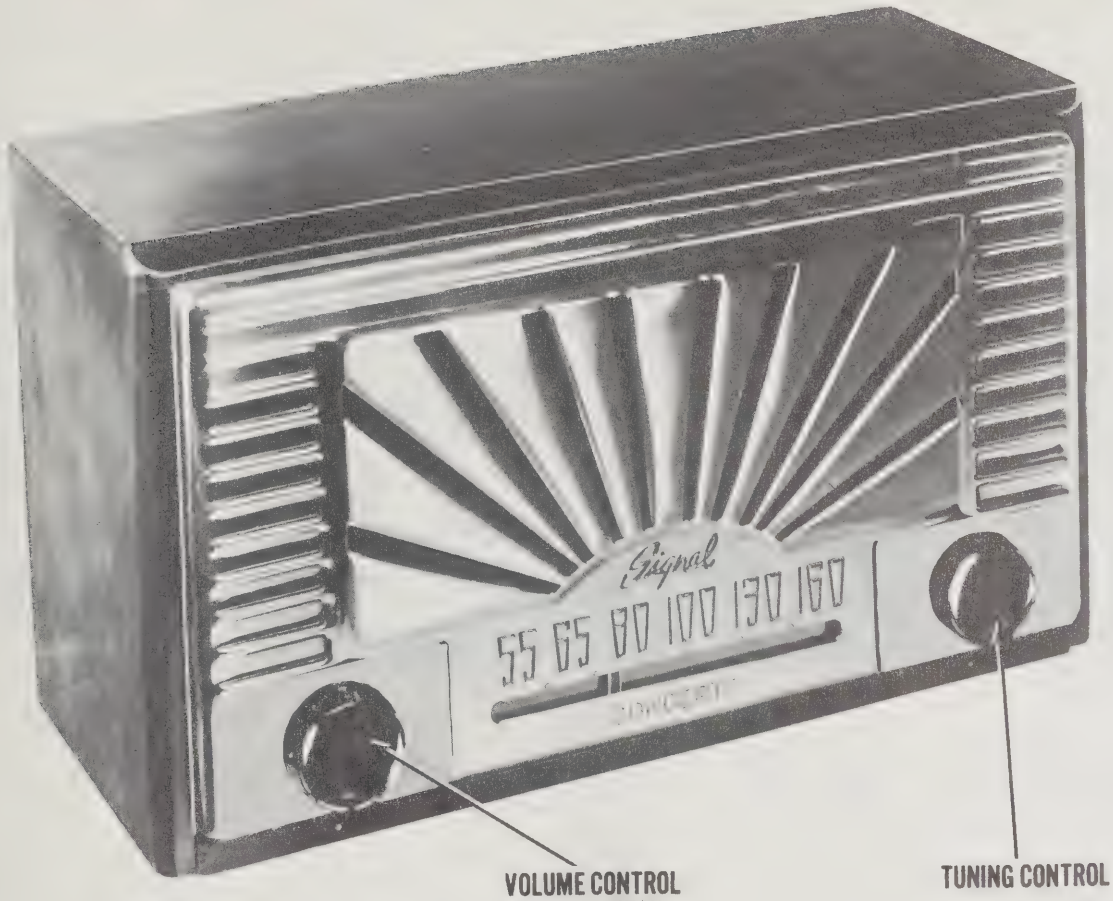
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SIGNAL
MODEL 241



SIGNAL
MODEL 241

SIGNAL MODEL 241

TRADE NAME	Signal, Model 241
MANUFACTURER	Signal Electronics, Inc., 114 E. 16th St., New York, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver Loop Antenna
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1620KC RATING .24 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used, reduce dummy ant. to .001 MFD to reduce hum modulation.
2	2 MMFD	High side to ext. ant. lead. Low side to chassis.	1620KC	"	"	A5	Adjust for maximum output. Trimmer opposite A5 is a factory adjustment and normally need not be adjusted.
3	2 MMFD	"	1400KC	Tune for maximum output.	"	A6	Adjust for maximum output.

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DATE 2/48 SET #33 FOLDER #483-25

PARTS LIST AND DESCRIPTIONS

SIGNAL MODEL 241

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		SIGNAL PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	SIGNAL PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
6A	50	150	230004	DSB-305	TA-530	PRSA150-30-50	DRD3515	Filter - Red
B	30	150						" - Green
C	50	25			TA-50	PRS25-50	BR502	Cathode Bypass-Yellow
7	.01	200	190003	MPH-6-01	TC-11	484-01	DT4S1	Line Filter
8	.02	400	190006	S-4-02	TC-12	484-02	DT4S2	Audio Coupling
9	.02	400	190006	S-4-02	TC-12	484-02	DT4S2	" "
10	.05	400	190001	S-4-05	TC-15	484-05	DT4S5	AVC Filter
11	2000	600	190007	S-6-002	TC-22	684-002	DT6D2	Output Plate Bypass
12	150		210001	MO.5-315	1FM-315	1468-00015	5W5T15	AF Plate Bypass
13	150		210001	MO.5-315	1FM-315	1468-00015	5W5T15	Diode RF Filter
14	150		210001	MO.5-315	1FM-315	1468-00015	5W5T15	" " "

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	SIGNAL PART No.	IRC PART No.	CLAROSTAT PART No.	
15A	500KΩ	½	300004	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 15A per instructions
C	Switch		" "	41	SW-A	" " " " "

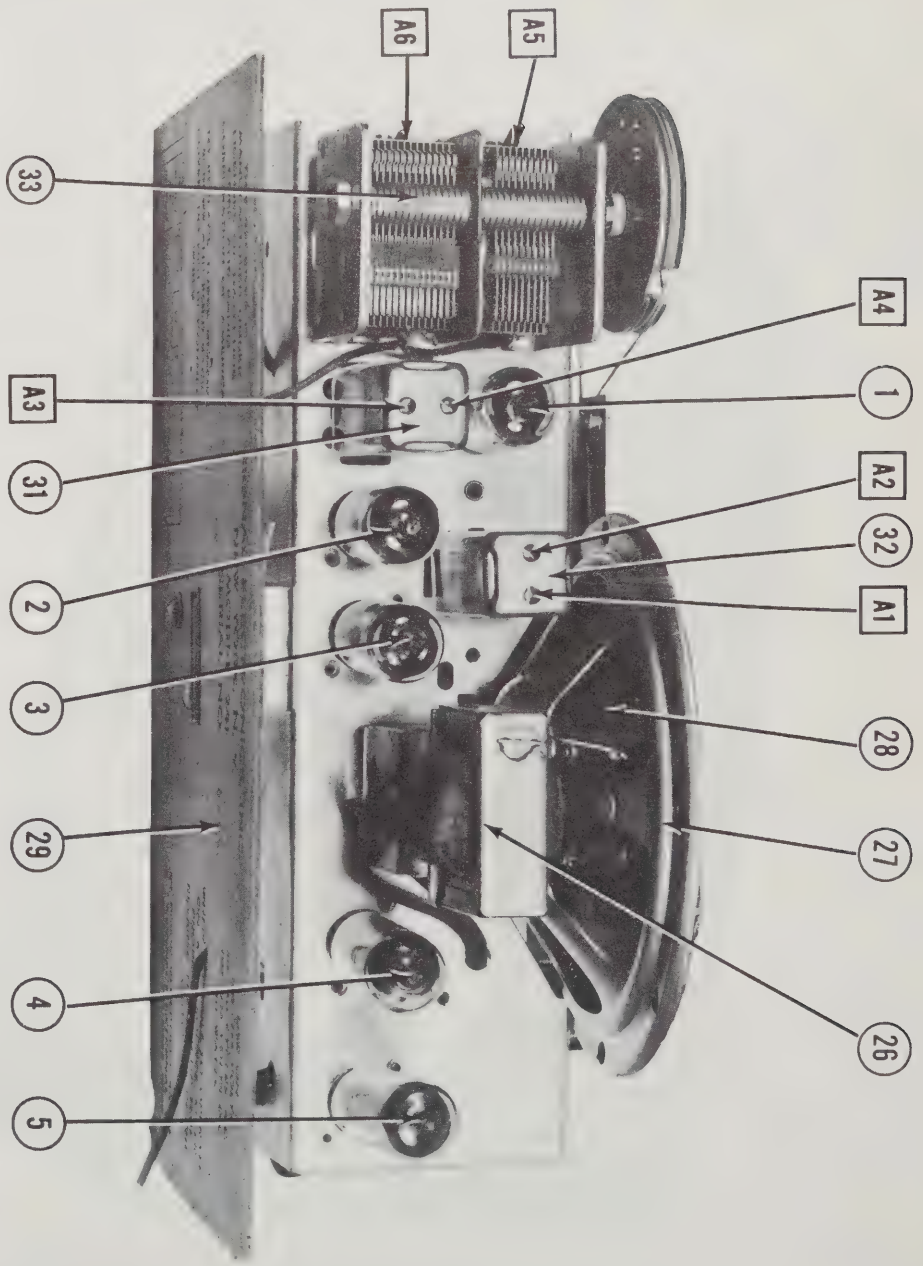
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SIGNAL PART No.	IRC PART No.	
16	18KΩ	½		BTS-18K	Br.-Gray-Or. Oscillator Grid
17	470Ω	½	272471	BTS-470	Yl.-Vi.-Br. IF Cathode
18	2.2 Meg.	½	272225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
19	51KΩ	½		BTS-47K	Grn.-Br.-Or. Diode RF Filter
20	10 Meg.	½	272106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
21	220KΩ	½	272224	BTS-220K	Red-Red-Yl. AF Plate Load
22	470KΩ	½	272474	BTS-470K	Yl.-Vi.-Yl. Output Grid
23	150Ω	½	272151	BW-½-150	Br.-Grn.-Br. Output Cathode
24	1000Ω	1	282102	BTA-1000	Br.-Blk.-Red Filter
25	27Ω	1	282270	BW-1-27	Red-Vi.-Blk. Rectifier Filament Shunt

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SIGNAL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
26	2000Ω	3.2Ω	165Ω	.5Ω	307003	A-3876*	T22S45*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

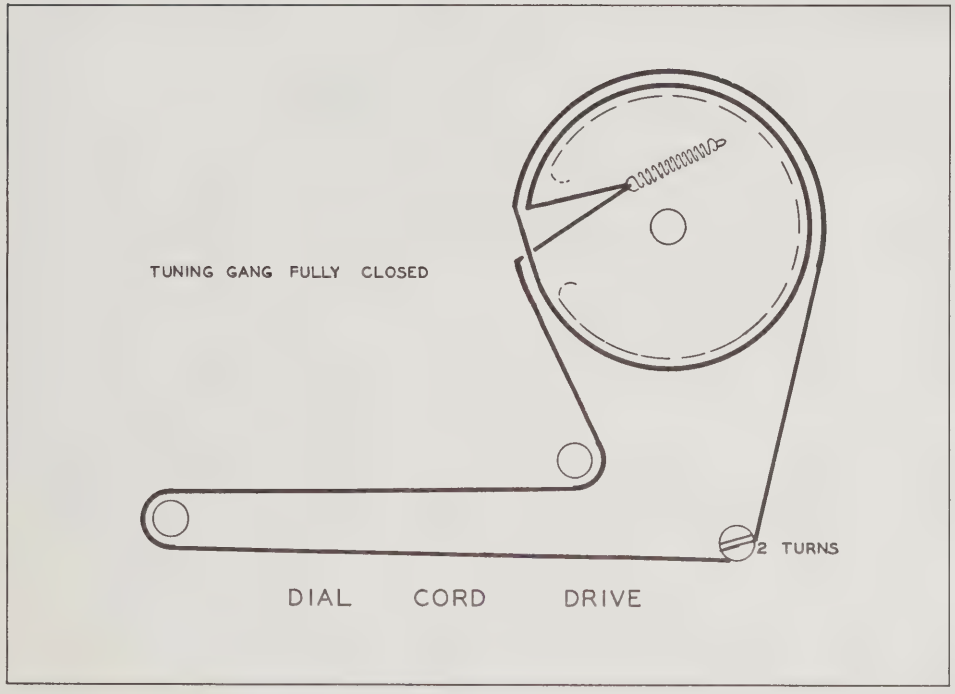
ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SIGNAL PART No.	JENSEN PART No.		
	FIELD	VC IMP.		ST-105		
27	PM	3.2Ω	185002	Mod. P5-X		
	CONE DIA.	VC DIA.				
28	4-3/4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

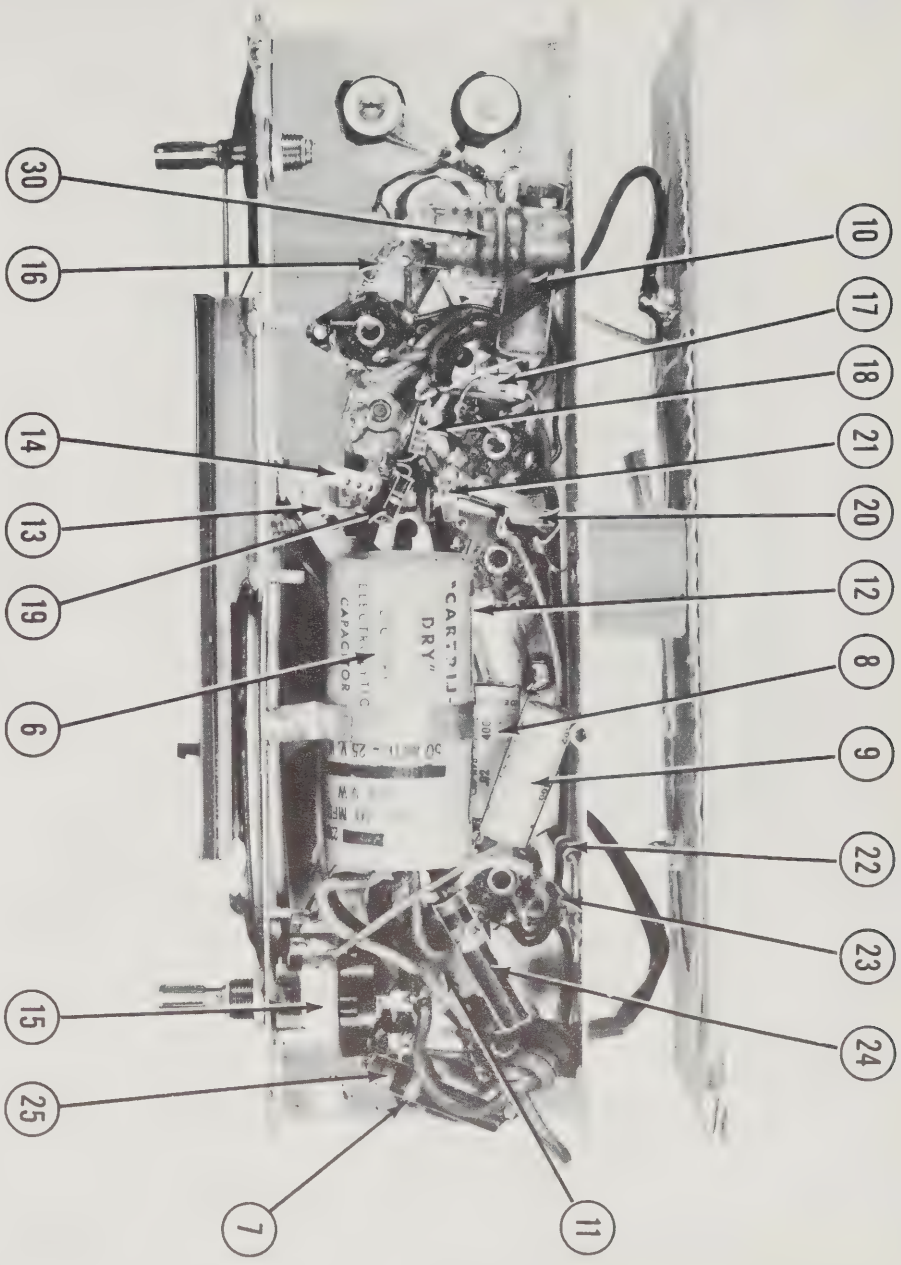
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SIGNAL PART No.	MEISSNER PART No.	
29	Loop Ant.		3.2Ω	247004		
30	Osc. Coil	1Ω	7.5Ω	248003	14-1040†	†Add 50 MMFD from osc. grid to high side tuning cap.
31	Input IF	14Ω	13.1Ω	305002	16-6668	
32	Output IF	16.8Ω	23Ω	305003	16-6669	

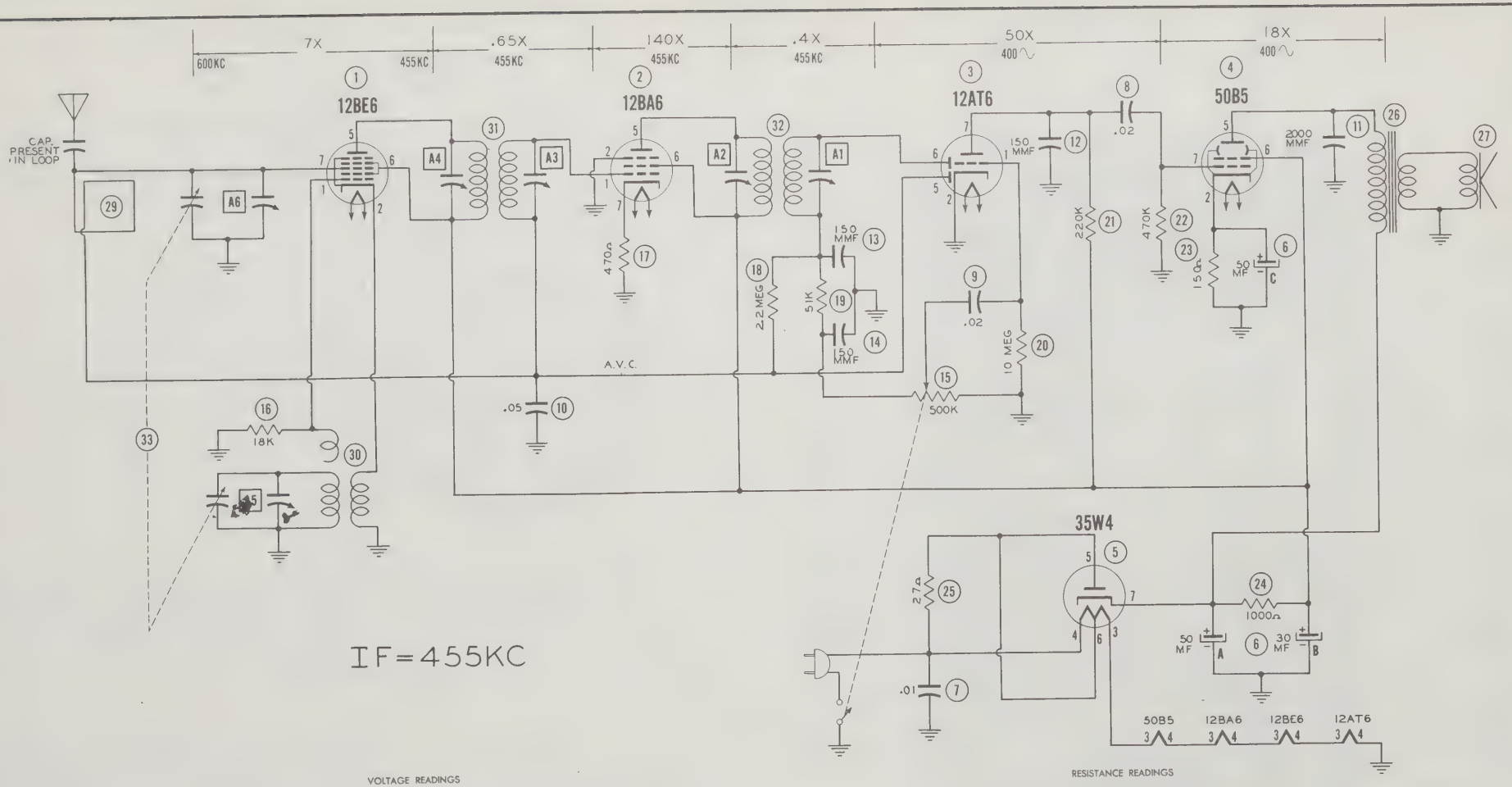
MISCELLANEOUS

ITEM No.	PART NAME	SIGNAL PART No.	NOTES
33	2 Gang Var. Cap	235001	(31-470MMF, 40-205 MMF)
	Dial Pointer	346005	
	Knob	359005	



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-8VDC§	0V.	26VAC	13VAC	100VDC	100VDC	-.4VDC
2	12BA6	-.4VDC	0V.	39VAC	26VAC	100VDC	100VDC	3.4VDC
3	12AT6	-.6VDC	0V.	13VAC	0V.	-.4VDC	-.4VDC	46.5VDC
4	50B5	0V.	6.6VDC	86VAC	38VAC	115VDC	100VDC	0V.
5	35W4	0V.	0V.	86VAC	117VAC	111VAC	111VAC	117VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	16KΩ	1Ω	24Ω	13Ω	10CKΩ	100KΩ	[illegible]
2	12BA6	2.5 Meg.	0Ω	36Ω	24Ω	100KΩ	100KΩ	500Ω
3	12AT6	10 Meg.	0Ω	13Ω	0Ω	2.5 Meg.	500KΩ	320KΩ
4	50B5	470KΩ	150Ω	85Ω	36Ω	100KΩ	100KΩ	470KΩ
5	35W4	INF.	INF.	85Ω	115Ω	109Ω	109Ω	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SILVERTONE MODEL
8005 (Ch. 132.839)

SILVERTONE MODEL
8005 (Ch. 132.839)

SILVERTONE 8005 (Ch. 132.839)

TRADE NAME	Silvertone, 8005 (Ch. 132.839)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Ant.
TUBES (FIVE)	Types, 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

In Steps 2, 3 & 4 a satisfactory alternate method of transmitting alignment signal to receiver is to fashion a loop of several turns of wire. Connect output of sig. gen. to this loop and radiate signal into loop of receiver.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to large stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	50MMFD (See pre-alignment notes)	High side to ext. ant. lead. Low side to B-.	1400KC	1400KC	"	A5	Adjust for maximum output.
3	50MMFD	"	"	Tune for maximum output.	"	A6	" " " "
4	50MMFD	"	600KC	"	"		Bend rotor plates of ant. section of tuning cap for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made.

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DATE 2/48 SET #33 FOLDER #483-26

PARTS LIST AND DESCRIPTIONS

SILVERTONE MODEL 5005 (Ch. 13_,360)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	6AD	
2	IF Amp.	12SK7GT	12SK7GT	6N	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	50	150	N21253	DSB-5030-150	TA-530	PRSA150-30-50	BRD3515	Filter - Red
B	30	150						" - Blue
7	.05	400		MPH-4-05	TC-15	484-05	DT4S5	Line Filter
8	.02	400		S-4-02	TC-12	484-02	DT4S2	Output Plate Bypass
9	.005	600		S-6-005	TC-25	684-005	DT6D5	Audio Coupling
10	.002	400		S-4-002	TC-22	484-002	DT4D2	" "
11	.05	200		S-4-05	TC-15	484-05	DT2S5	AVC Filter
12	.1	400		S-4-1	TC-1	484-.1	DT4P1	Line Isolation
13	.005	600		S-6-005	TC-25	684-005	DT6D5	Ext. Ant. Isolation
14	500			MO.5-35	1FM-35	1468-0005	5W5T5	AF Plate Bypass
15	250			MO.5-325	1FM-325	1468-00025	5W5T25	Diode RF Filter
16	50			MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
17A	1 Meg.	½	N21251	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	IDENTIFICATION CODES
18	330KΩ	½		BTS-330K	Or.-Or.-Yl. Line Isolation
19	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AVC Network
20	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
21	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
22	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue AF Grid
23	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
24	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
25	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
26	22Ω	½		BW-½-22	Red-Red-Blk. Surge Limiter
27	330Ω	½		BW-½-330	Or.-Or.-Br. Pilot Light Shunt

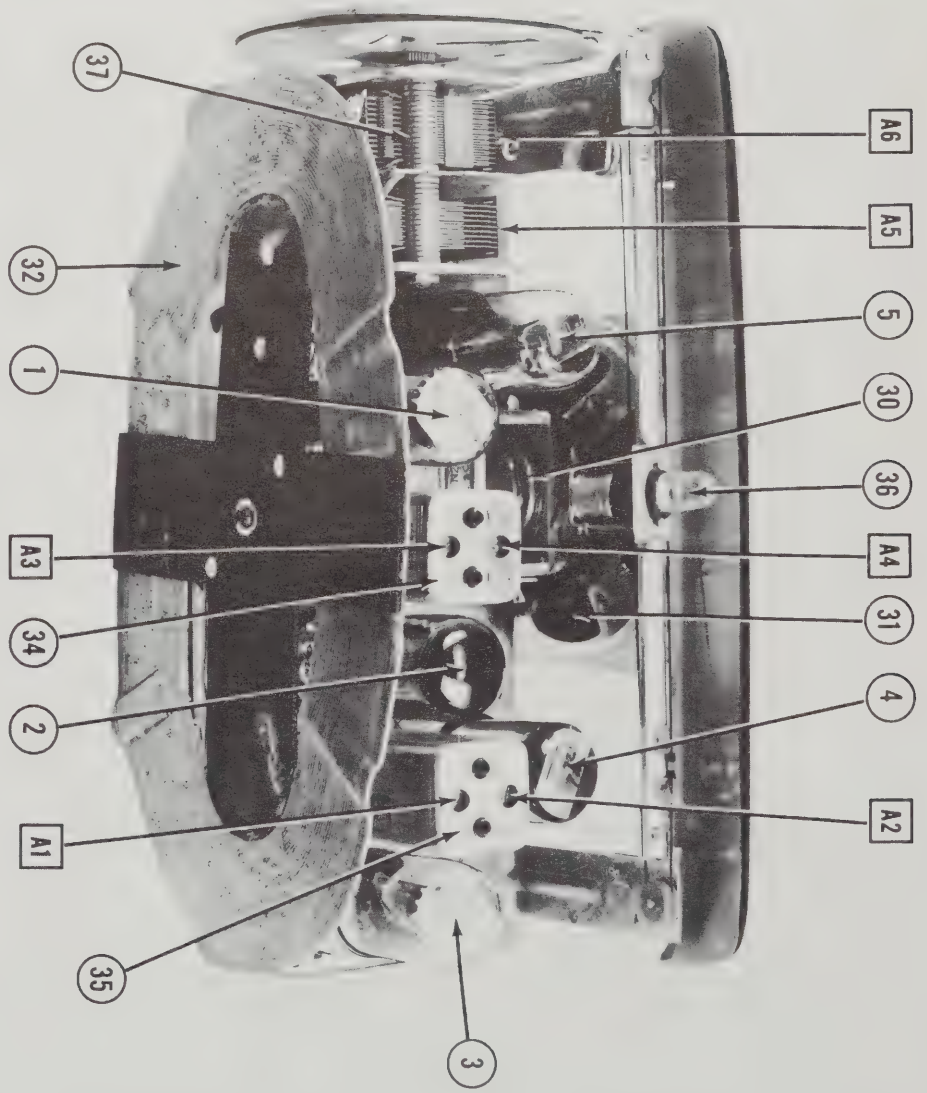
FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: SILVERTONE PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	INSTALLATION NOTES
28	.026A	400Ω	8 Henries	N21246	C-1707*	T20C52*	C-2975*	*Drill one new mounting hole.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
29	2250Ω	3.6Ω	100Ω	.4Ω	N21247	A-3876	T22S45	A-2928	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: SILVERTONE PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.				
30	PM	3.6Ω	N21248			
	CONE DIA.	VC DIA.				
31	4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

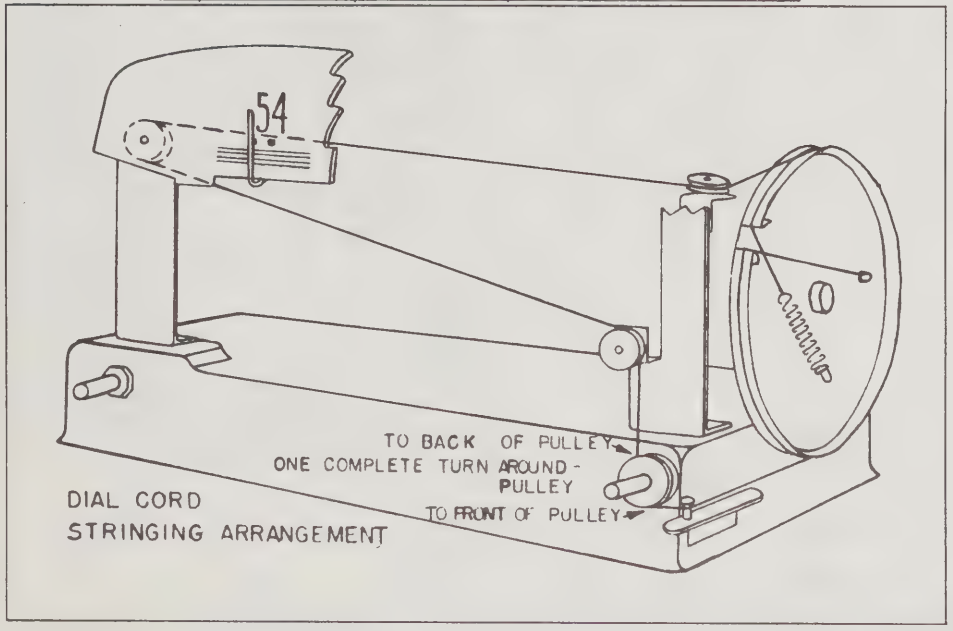
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: SILVERTONE PART No.	MEISSNER PART No.	
32	Loop Ant.	.6Ω	1.2Ω	N21245		
33	Osc. Coil	.8Ω	6Ω	N19354	14-1040	
34	Input IF	21.2Ω	20.8Ω	N21424	16-6658	
35	Output IF	21.1Ω	21Ω	N21425	16-6660	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: SILVERTONE PART No.		INSTALLATION NOTES
36	Bayonet	6-8	0.15	Brown			Type 47

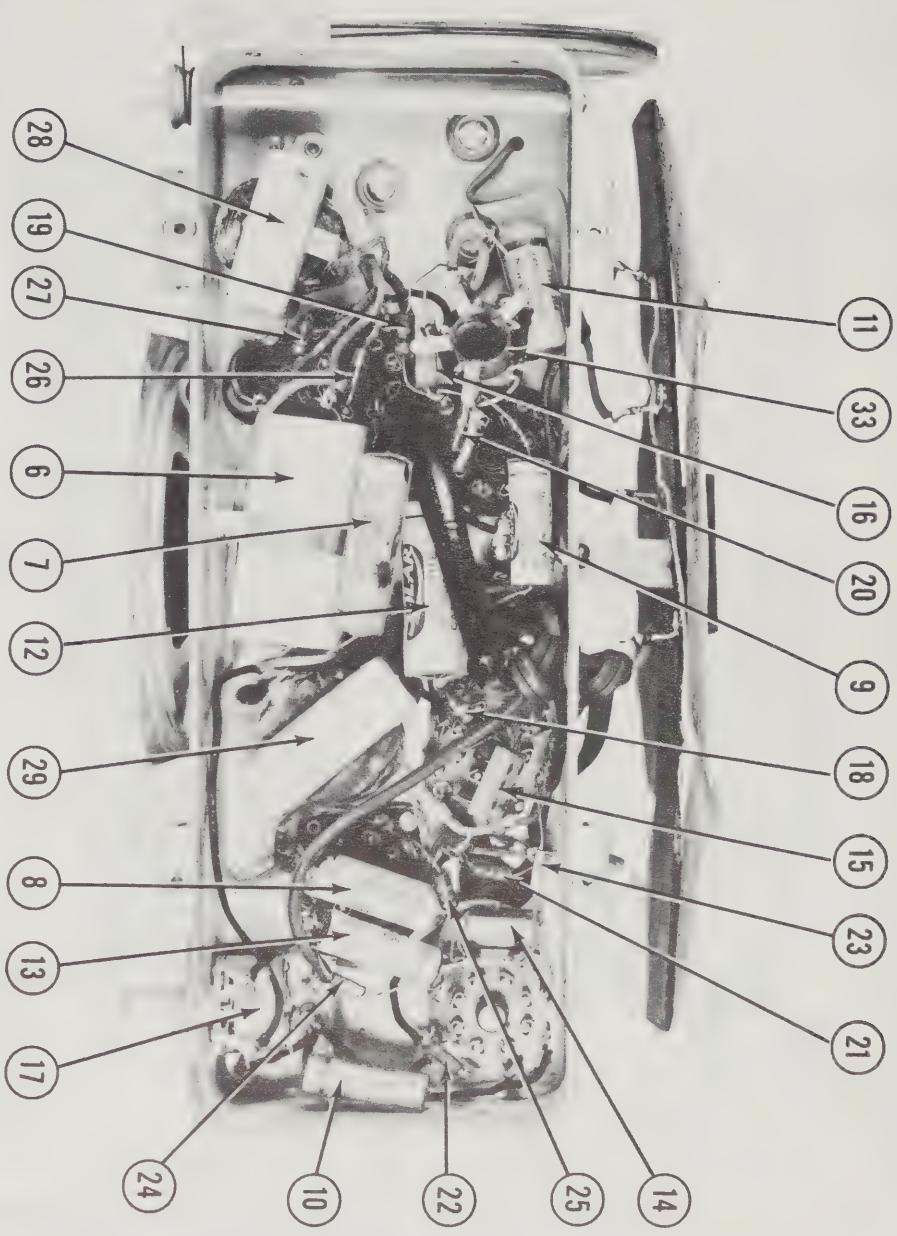
MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
37	2 Gang Var. Cap	N21252	(20-410MMF, 34-200MMF)
	Knob	N21204	On-off, volume or tuning
	Dial Pointer	N21145	
	Dial Scale	N21145	With Pointer Rail

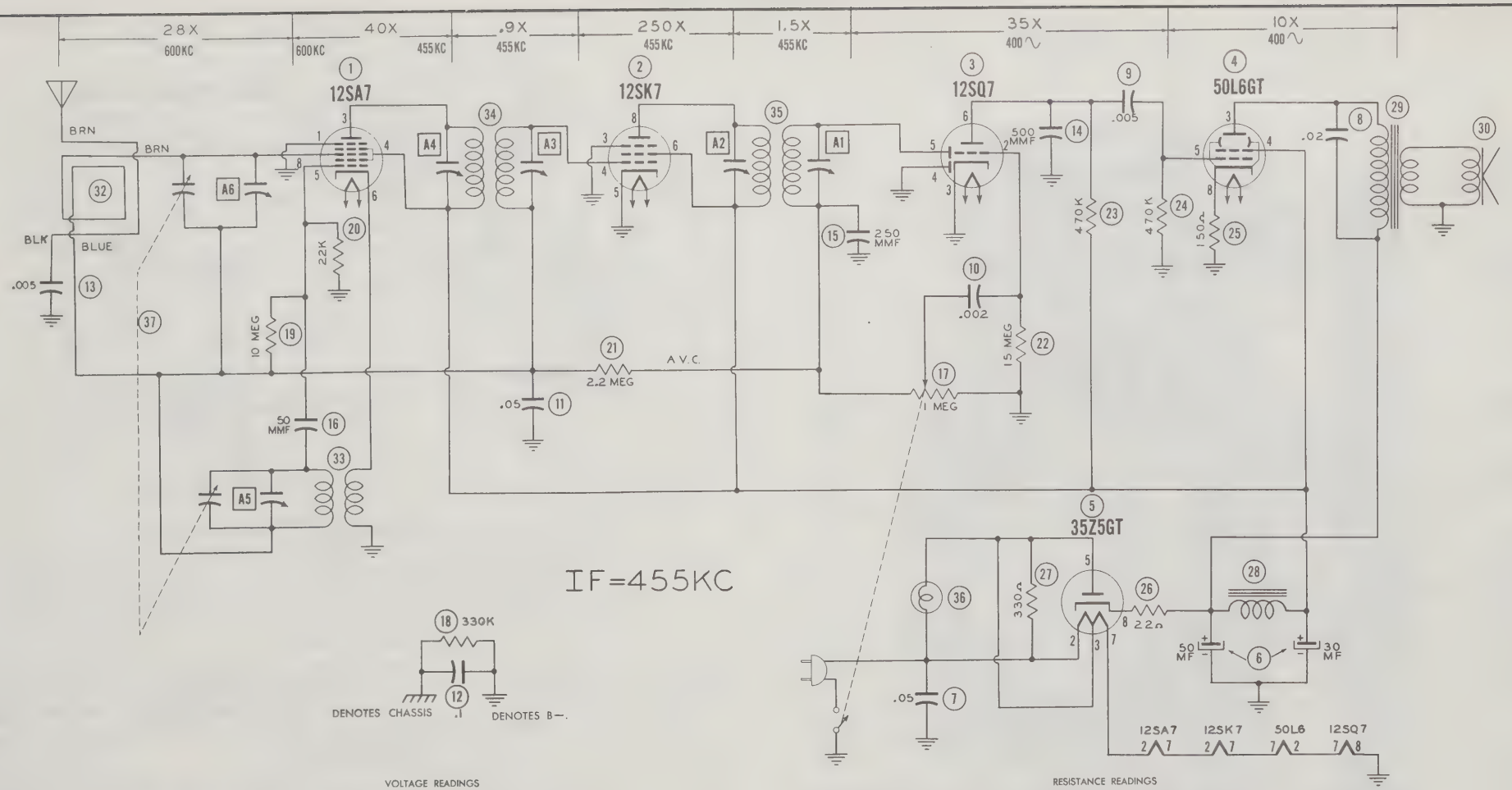


DIAL CORD STRINGING ARRANGEMENT

CHASSIS—BOTTOM VIEW



SILVERTONE MODEL 8005 (Ch. 132.839)



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	86VAC	100VDC	100VDC	-13.5VDC§	0V.	72VAC	-.4VDC
2	12SK7GT	0V.	72VAC	0V.	-.4VDC	0V.	100VDC	60VAC	100VDC
3	12SQ7GT	0V.	-.9VDC	0V.	-.6VDC	0V.	82VDC	13VAC	0V.
4	50L6GT	0V.	13VAC	107VDC	100VDC	0V.	111VDC	60VAC	6VDC
5	35Z5	0V.	117VAC	113VAC	111VDC	113VAC	117VAC	86VAC	112.5VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	310KΩ	82Ω	100KΩ	100KΩ	23KΩ	.5Ω	70Ω	2.5 Meg
2	12SK7GT	310KΩ	70Ω	0Ω	2.5 Meg.	0Ω	100KΩ	57Ω	100KΩ
3	12SQ7GT	310KΩ	10 Meg.	0Ω	900KΩ	0Ω	570KΩ	13Ω	0Ω
4	50L6GT	310KΩ	13Ω	100KΩ	100KΩ	430KΩ	100KΩ	57Ω	145Ω
5	35Z5	INF.	110Ω	104Ω	100KΩ	104Ω	110Ω	13Ω	100KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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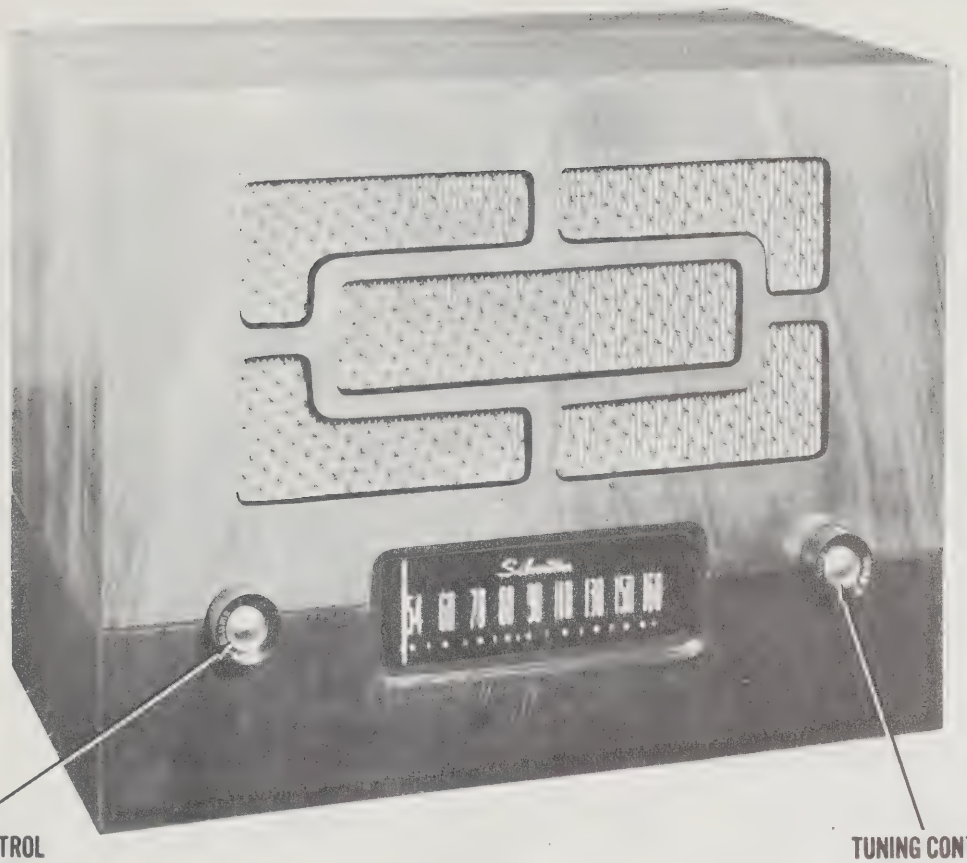
483-26

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SILVERTONE
MODEL 8050 (Ch. 101.813)



SILVERTONE
MODEL 8050 (Ch. 101.813)

SILVERTONE MODEL 8050

TRADE NAME	Silvertone, Model 8050 (Ch. 101.813)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 14Q7 Converter, 14A7 IF Amp., 7C6 Det.-AVC-AF, 50A5 Power Output, 35Y4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1650KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to light brown index dot at left end of dial backplate.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) 14Q7. Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	200MMFD	High side to ext. ant. terminal. Low side to B-.	1650KC	Tuning cap. fully open.	"	A5	Adjust for maximum output.
3	200MMFD	"	1410KC	Tune for maximum output.	"	A6	" " " "

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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DATE 2/48 SET #33 FOLDER #433-27

PARTS LIST AND DESCRIPTIONS

ILVERTONE MODEL [illegible]
(Cl. 1c1. 13)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		SILVERTONE PART No.	STANDARD REPLACEMENT		
1	Converter	14Q7	14Q7	8AL	
2	IF Amp.	14A7	14A7	8V	
3	Det.-AVC-AF	7C6	7C6	8W	
4	Power Output	50A5	50A5	6AA	
5	Rectifier	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	SILVERTONE PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
6A	40	150	R60416	DY-305	EL-352		UP4415C	■ Filter
B	40	150						▲ "
C	20	150						Cathode Bypass
7	05	600		MPH-6-05	TC-15	684-05	DT6S5	Line Filter
8	02	400		S-4-02	TC-12	484-02	DT4S2	Output Plate Bypass
9	005	600		S-6-005	TC-25	684-005	DT6D5	Audio Coupling
10	05	200		S-4-05	TC-15	484-05	DT2S5	AF Plate Decoupling
11	.1	400		S-4-1	TC-1	484-.1	DT4P1	Line Isolation
12	005	600		S-6-005	TC-25	684-005	DT6D5	Audio Coupling
13	05	200		S-4-05	TC-15	484-05	DT2S5	RF Bypass Pwr. Supply
14	05	200		S-4-05	TC-15	484-05	DT2S5	AVC Filter
15	05	200		S-4-05	TC-15	484-05	DT2S5	" "
16	05	600		S-6-05	TC-15	684-05	DT6S5	Conv. Cath. Bypass
17	001	600		S-6-001	TC-21	684-001	DT6D1	Ext. Ant. Coupling
18	01	600		S-6-01	TC-11	684-01	DT6S1	Tuning Cap. Isolation
19	100			MO.5-31	1FM-31	1468-0001	5W5T1	AF Plate Bypass
20	50			MO.5-45	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESIST-ANCE	WATTS	SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	
21	500KΩ	½	R61658			Volume Control & Sw.

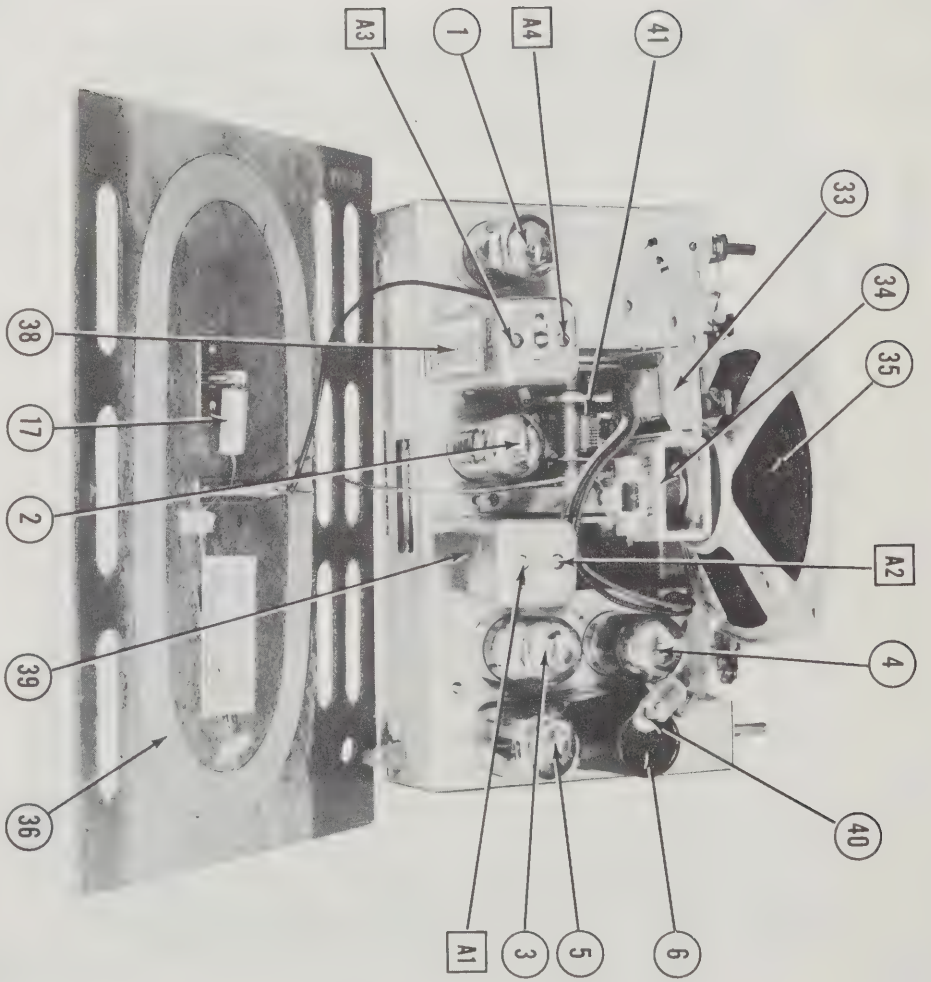
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	
22	2.2 Meg.	1/3		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
23	22KΩ	1/3		BTS-22K	Red-Red-Or. AVC Network
24	22KΩ	1/3		BTS-22K	Red-Red-Or. Oscillator Grid
25	100Ω	1/3		BW-½-100	Br.-Blk.-Br. Converter Cathode
26	4.7 Meg.	1/3		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
27	2.2 Meg.	1/3		BTS-2.2 Meg.	Red-Red-Grn. AF Plate Load
28	470KΩ	1/3		BTS-470K	Yl.-Vi.-Yl. AF Plate Decoupling
29	470KΩ	1/3		BTS-470K	Yl.-Vi.-Yl. Output Grid
30	150Ω	1/3		BW-½-150	Br.-Grn.-Br. Output Cathode
31	1200Ω	1		BTA-1200	Br.-Red-Red Filter
32	25Ω	1	R40232	BW-1-27	Red-Grn.-Blk. Surge Limiter

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
33	2000Ω	3.3Ω	253Ω tapped @ 13Ω	.7Ω	R62670	A-3876*		A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket. Add extra filter to reduce hum level.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA SILVERTONE PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-105†		†Use adaptor baffle
34	PM	3.3Ω	R62544	Mod. P5-X		
	CONE DIA.	VC DIA.				
35	5-1/8"	1/2"	R62699			

R F COILS

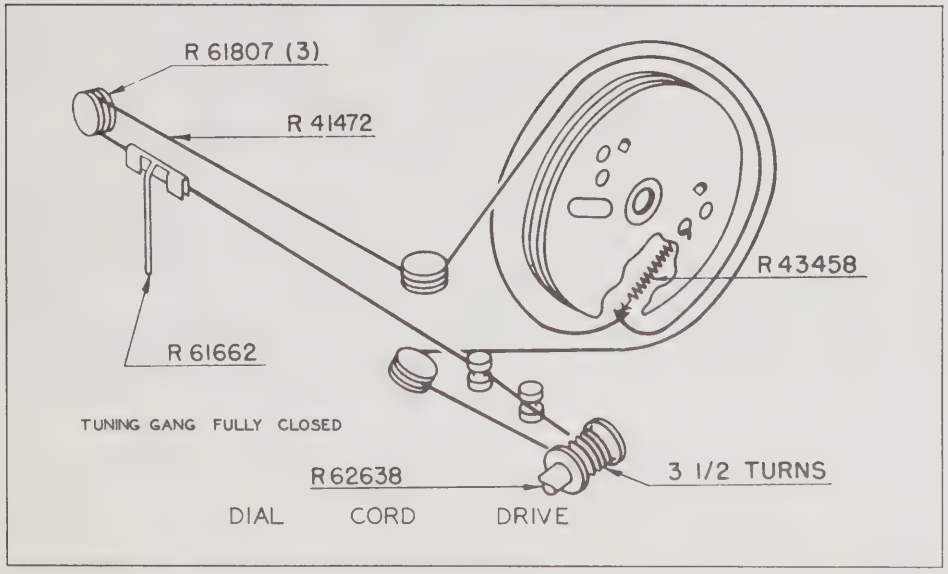
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA SILVERTONE PART No.	MEISSNER PART No.
36	Loop Ant.		1.7Ω	R61664	
37	Osc. Coil		18Ω	R61107	14-1040
38	Input IF	23.1Ω	23.4Ω	R62513	16-6658
39	Output IF	12Ω		R61142	16-6670

DIAL LIGHT

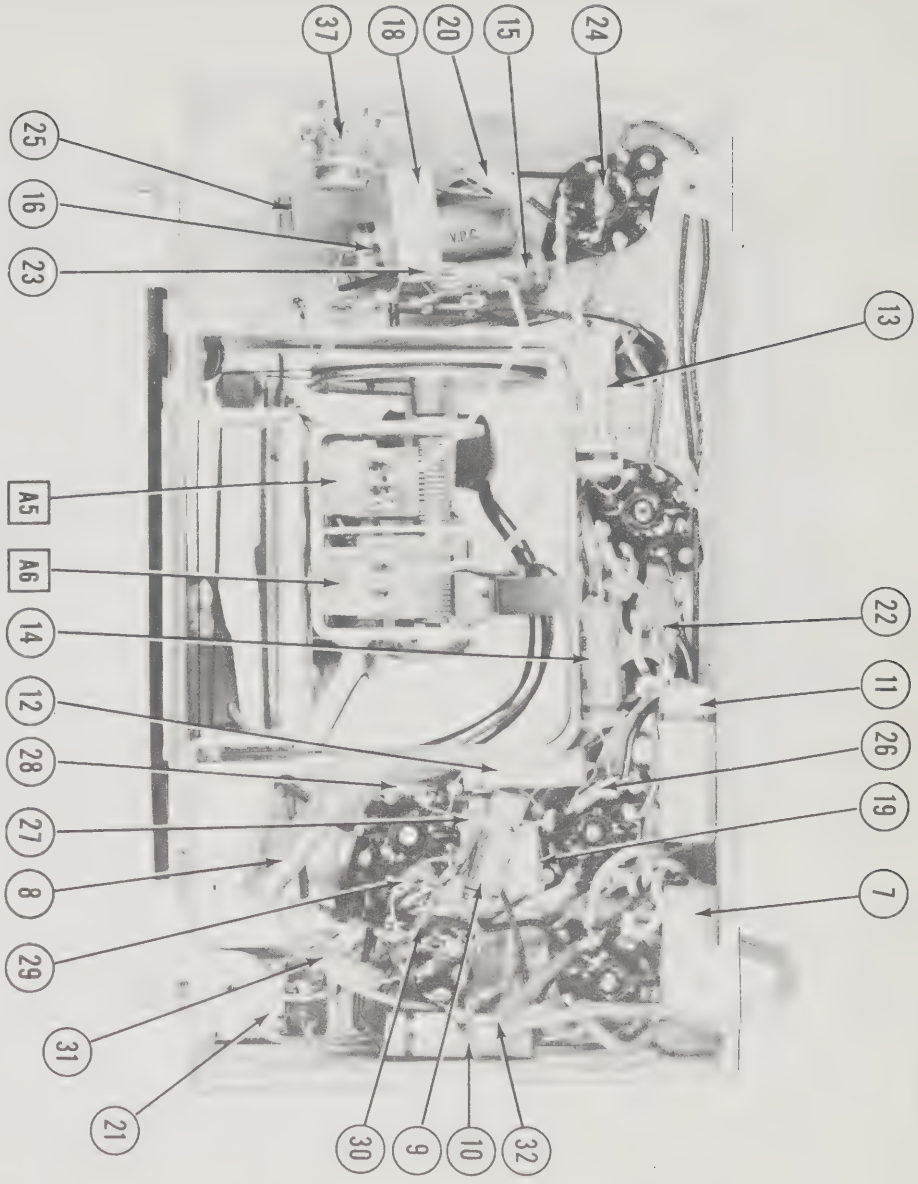
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA SILVERTONE PART No.		INSTALLATION NOTES
40	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

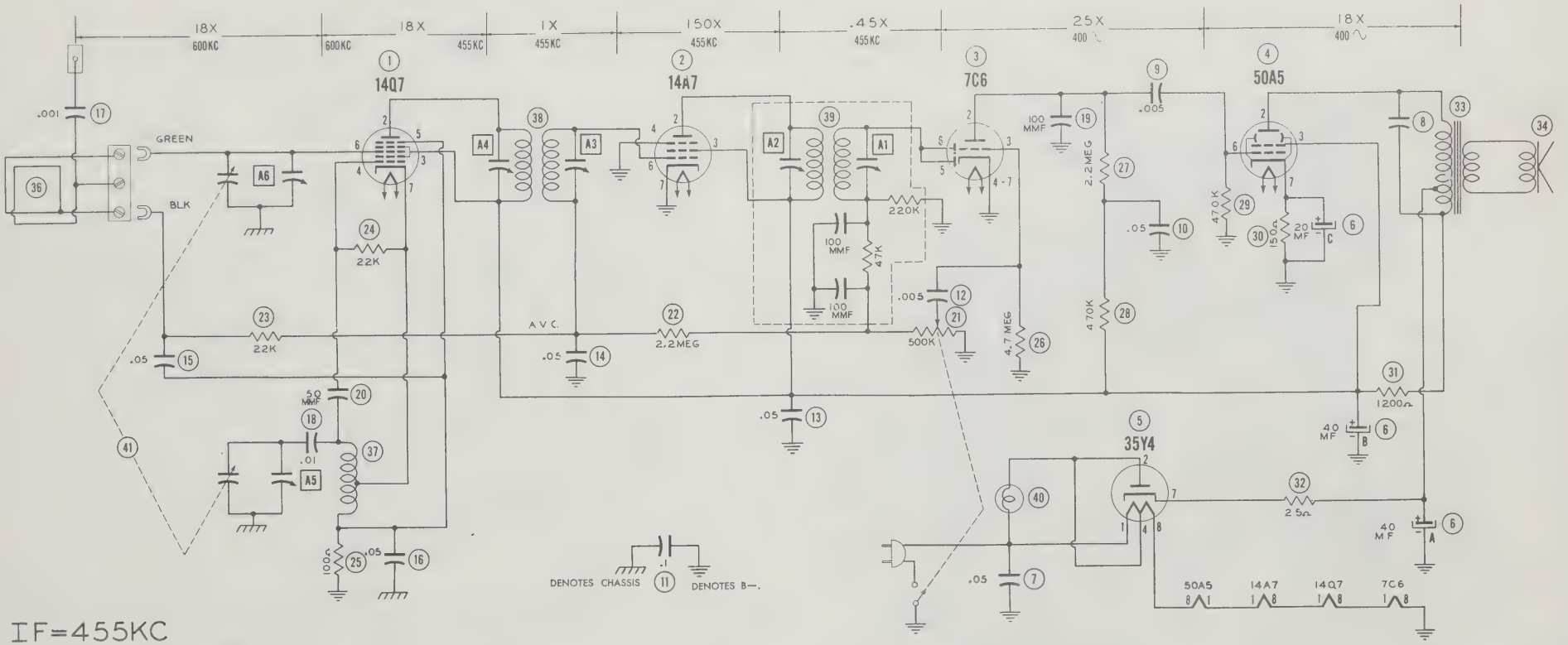
ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
41	2 Gang Var. Cap.	R61100	(38-493MMF, 30-185MMF)
	Dial	R62327	
	Dial Pointer	R61662	
	Knob	R62712	Tuning
	"	R62713	On-Off-Volume



CHASSIS—BOTTOM VIEW



SILVERTONE MODEL 8050 (Ch. 101.813)



IF=455KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	20VAC	83VDC	83VDC	-9VDC§	1.2VDC	-.05VDC	1.2VDC	7VAC
2	14A7	33VAC	83VDC	83VDC	0V.	0V.	-.05VDC	0V.	20VAC
3	7C6	7VAC	6.1VDC	-.4VDC	0V.	-.5VDC	-.5VDC	0V.	0V.
4	50A5	33VAC	107VDC	85VDC	70VDC	0V.	0V.	5.4VDC	84VAC
5	35Y4	117VAC	114VAC	0V.	114VAC	0V.	70VDC	115VDC	84VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	15Ω	200KΩ	200KΩ	22KΩ	100Ω	3 Meg.	100Ω	0
2	14A7	32Ω	200KΩ	200KΩ	0Ω	0Ω	3 Meg.	0Ω	1
3	7C6	8Ω	2.5 Meg.	5 Meg.	0Ω	170KΩ	170KΩ	0Ω	0
4	50A5	32Ω	200KΩ	200KΩ	670KΩ	500KΩ	470KΩ	150Ω	0
5	35Y4	110Ω	107Ω	INF.	107Ω	0Ω	670KΩ	20KΩ	0

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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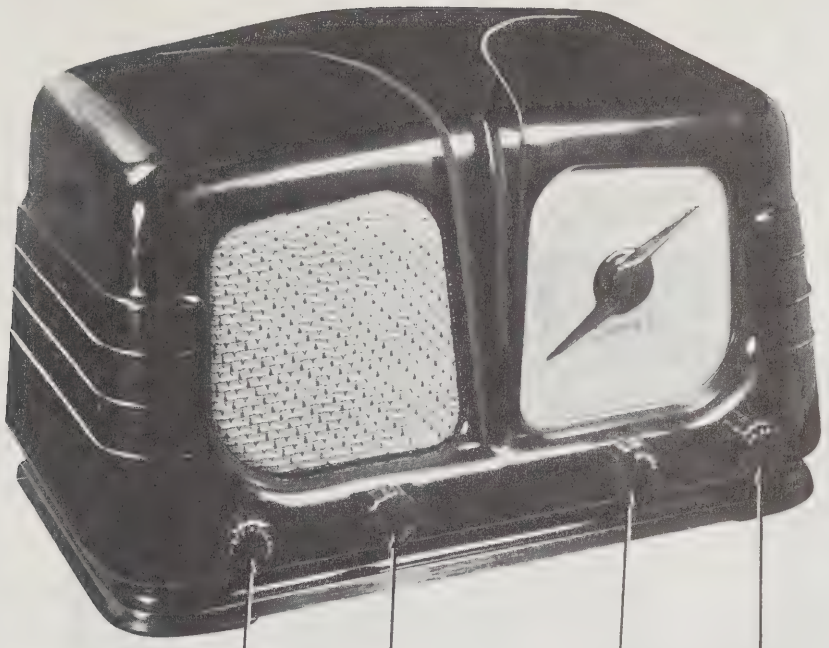
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

SONORA MODEL
WEU-262



SONORA MODEL WEU-262

TRADE NAME	Sonora, Model WEU-262
MANUFACTURER	Sonora Radio & Tele. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (EIGHT)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6BA6 IF Amp., 6AL5 Ratio Det., 6SQ7 AM Det.-AVC-AF, 25L6GT Power Output, 25Z6GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC RATING .42 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1620KC FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial.
Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD.	High side to Pin 7 (grid) 6BE6. Low side to B-.	455KC	BC (Counter-clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation. Always use peak obtained when slug is turned out the greatest distance.
2	100MMFD	High side to ext. ant. lead. Low side to B-.	1620KC	"	"	"	A5	Adjust for maximum output
3	100MMFD	"	1400KC	"	Tune for max-imum output.	"	A6	Adjust for maximum output Check calibration and sensitivity at 600KC.

FOR FM ALIGNMENT SEE LAST PAGE OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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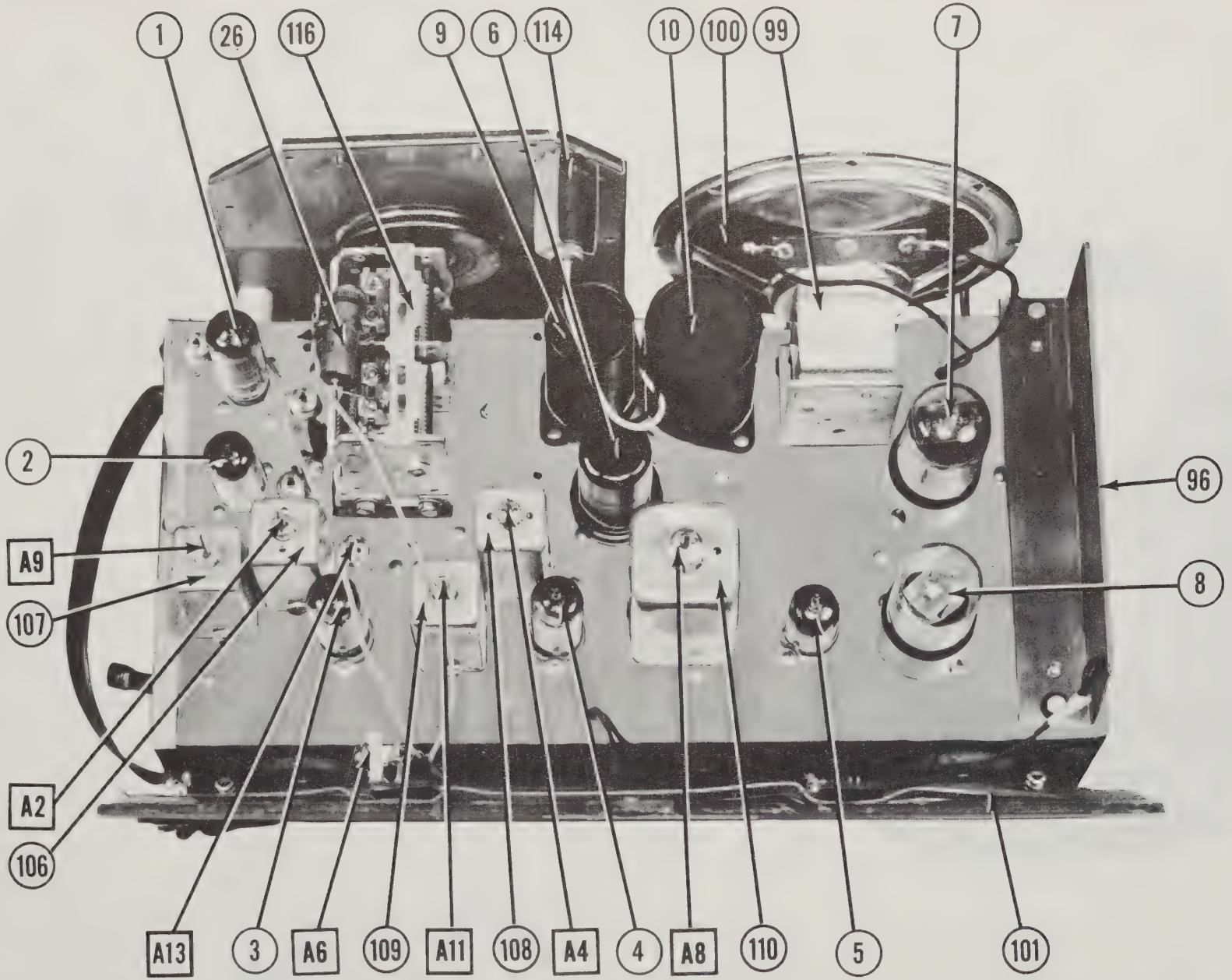
DATE 2/48 SET #33 FOLDER #483-28

SONORA MODEL
WEU-262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107
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A6
109
A11
108
A4
4
A8
110
5
101

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	IF Amp.	6BA6	6BA6	7BK	
4	IF Amp.	6BA6	6BA6	7BK	
5	Ratio Detector	6AL5	6AL5	6BT	
6	AM Det.-AVC-AF	6SQ7	6SQ7	3Q	
7	Power Output	25L6GT	25L6GT	7AC	
8	Rectifier	25Z6GT	25Z6GT	7Y	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SONORA PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9	30	150	N-6312	DY-30-150	EL-35	AF18D	UP8015	Filter
10A	50	150	N-6313	DY-419	EL-452	AF101010D4A	UP55515C	"
B	50	150						"
C	50	150						"
D	20	25						Cathode Bypass
11	6	150		M-8-150	UT-81	PRS150-8	BR815	Stabilizing Cap.
12	.05	400	N-1346	MPH-4-05	TC-15	484-05	DT4S5	Line Filter
13	.01	400	N-1344	S-4-01	TC-11	484-01	DT4S1	Output Plate Bypass
14	.01	400	N-1344	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
15	.1	200	N-1351	S-2-.1	TC-1	484-.1	DT4P1	AF Plate Decoupling
16	.1	200	N-1351	S-2-.1	TC-1	484-.1	DT4P1	RF Bypass Power Supply
17	.005	600	N-1494	S-6-005	TC-25	684-005	DT6D5	Tone Comp.
18	.01	400	N-1344	S-4-01	TC-11	484-01	DT4S1	" "
19	.005	600	N-1494	S-6-005	TC-25	684-005	DT6D5	Audio Coupling
20	.002	600	N-1377	S-6-002	TC-22	684-002	DT6D2	De-emphasis
21	.02	400	N-1376	S-4-02	TC-12	484-02	DT4S2	Audio Coupling
22	.05	200	N-1345	S-4-05	TC-15	484-05	DT4S5	AVC Filter
23	.1	200	N-1351	S-2-.1	TC-1	484-.1	DT4P1	Line Isolation
24	.05	400	N-1345	S-4-05	TC-15	484-05	DT4S5	AVC Filter
25	.01	400	N-1344	S-4-01	TC-11	484-01	DT4S1	Ext. Ant. Isolation
26	.05	200	N-1345	S-4-05	TC-15	484-05	DT4S5	Tuning Cap. Isolation
27	250		N-6488	MO.5-325	1FM-325	1468-00025	5W5T25	AF Plate Bypass
28	250		N-6488	MO.5-325	1FM-325	1468-00025	5W5T25	RF Bypass
29	250		N-6488	MO.5-325	1FM-325	1468-00025	5W5T25	" " - See Note
30	10000		N-6482	MW.3-11	1FM-11	1467-01	1D3S1	" "
31	250		N-6488	MO.5-325	1FM-325	1468-00025	5W5T25	Diode Load Cap.
32	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	Filament Bypass
33	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	Driver Plate Decoupling
34	130		N-6487	MO.5-315	1FM-315	1468-00015	5W5T15	Diode Load Cap.
35	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	Driver Cathode Bypass
36	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	RF Bypass
37	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	AVC Filter
38	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	1st IF Decoupling
39	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	IF Cathode Bypass
40	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	AVC Filter
41	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	Conv. Plate Decoupling
42	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	Conv. Screen Bypass
43	10000		N-6482	MW.3-11	1FM-11	1467-01	1D3S1	RF Bypass
44	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	RF Bypass Pwr. Supply
45	50		N-6385	MO.5-45	1FM-45	1468-00005	5W5Q5	Diode RF Filter
46	50		N-6385	MO.5-45	1FM-45	1468-00005	5W5Q5	" " "
47	4.5		N-6483	MO.5-55	MS-55	1468-000005	5W5V5	Feedback -See Note
48	50		N-6385	MO.5-55	1FM-45	1468-00005	5W5Q5	Osc. Grid Cap.
49	250		N-6488	MO.5-325	1FM-325	1468-00025	5W5T25	Filament Bypass
50	100		N-6015	MO.5-45	1FM-31	1468-0001	5W5T1	RF Coupling
51	50		N-6385	MO.5-45	1FM-45	1468-00005	5W5Q5	" "
52	75		N-6484			1469-000075		Fixed Pad
53	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	RF Screen Bypass
54	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	RF Cathode Bypass
55	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	AVC Filter
56	250		N-6488	MO.5-325	1FM-325	1468-00025	5W5T25	RF Bypass
57	20		N-6584	MOS.5-42	MS-42	1468-000025	5W5Q2	FM Ant. Pri. Shunt
58	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	Fil. Bypass
59	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	RF Bypass
60	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	" "
61	4.5		N-6483	MO.5-55	MS-55	1468-000005	5W5V5	Fixed Trimmer-See Note
117	5000		N-6272	MW.5-25	1FM-25	1467-005	1D5D5	Filament Bypass

Note-Not used in all models.

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
62A	500KΩ	½	N-6274	D13-133X	AT-78	Volume Control tapped @ 100KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 62A per instructions
C	Switch		" "	41	SW-A	" " " " "
63	500KΩ	½	N-6273			Tone Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SONORA PART No.	IRC PART No.	IDENTIFICATION CODES
64	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl. AVC Network
65	1 Meg.	½	N-1262	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
66	2.2 Meg.	½	N-4277	BTS-2.2 Meg.	Red-Red-Grn. RF Grid
67	68Ω	½	N-6485	BW-½-68	Blue-Gray-Blk. RF Cathode
68	2200Ω	½	N-4898	BTS-2200	Red-Red-Red RF Screen Dropping
69	820Ω	½	N-4279	BTS-820	Gray-Red-Br. RF Plate Load
70	10KΩ	½	N-4395	BTS-10K	Br.-Blk.-Or. Converter Grid
71	22KΩ	½	N-4025	BTS-22K	Red-Red-Or. Oscillator Grid
72	12Ω	½	N-5053	BW-½-12	Br.-Red-Blk. Parasitic Suppressor
73	1000Ω	½	N-1694	BTS-1000	Br.-Blk.-Red Converter Screen Decoupling
74	1000Ω	½	N-1694	BTS-1000	Br.-Blk.-Red Converter Plate Decoupling
75	68Ω	½	N-6485	BW-½-68	Blue-Gray-Blk. 1st IF Cathode
76	470Ω	½	N-6011	BTS-470	Yl.-Vi.-Br. 1st IF Decoupling
77	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl. AVC Network
78	47KΩ	½	N-4063	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
79	68Ω	½	N-6485	BW-½-68	Blue-Gray-Blk. 2nd IF Cathode
80	470Ω	½	N-6011	BTS-470	Yl.-Vi.-Br. 2nd IF Decoupling
81	68Ω	½	N-6485	BW-½-68	Blue-Gray-Blk. Balancing Resistor
82	33KΩ	½	N-4064	BTS-33K	Or.-Or.-Or. De-emphasis
83	100KΩ	½	N-2573	BTS-100K	Br.-Blk.-Yl. AVC Network
84	33KΩ	½	N-4064	BTS-33K	Or.-Or.-Or. Ratio Detector Load
85	27KΩ	½	N-4451	BTS-27K	Red-Vi.-Or. Tone Compensation
86	1.8 Meg.	½	N-6486	BTS-1.8 Meg.	Br.-Gray-Grn. AVC Network
87	6.8 Meg.	½	N-4028	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
88	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl. AF Plate Load
89	68KΩ	½	N-5693	BTS-68K	Blue-Gray-Or. AF Plate Decoupling
90	470KΩ	½	N-4027	BTS-470K	Yl.-Vi.-Yl. Output Grid
91	150Ω	½	N-3663	BW-½-150	Br.-Grn.-Br. Output Cathode
92	100Ω	½	N-1615	BW-½-100	Br.-Blk.-Br. Filter
93	150Ω	½	N-3663	BW-½-150	Br.-Grn.-Br. "
94	68Ω	1	N-6379	BW-1-68	Blue-Gray-Blk. "
95	12Ω	½	N-5053	BW-½-12	Br.-Red-Blk. Surge Limiter
96A	100Ω	7.7	N-6362	AB-100	Pilot Light Shunt
B	60Ω	6	N-6311	AB-75	Line Dropping-See Note 1
97	Special				Series Pilot Light-See Note 2

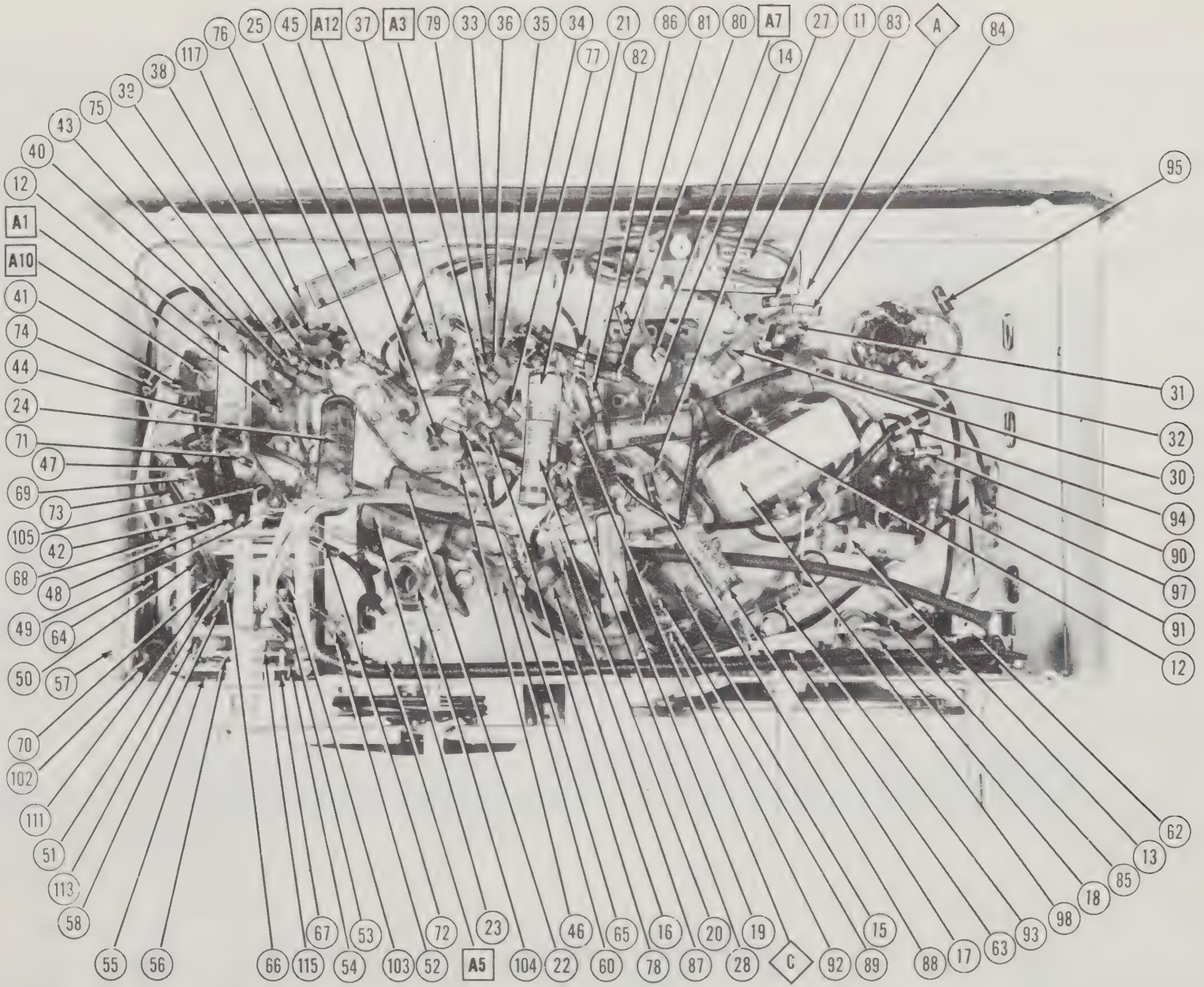
Note 1-On IRC replacement set slider at 60Ω from one end.
Note 2-This is a special regulating resistor.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SONORA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
98	2100Ω	3.2Ω	230Ω tapped @ 3Ω	.6Ω	N-6369	A-3676*†		A-2902*	*Add extra filter to reduce hum level. †Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: SONORA PART No.	JENSEN PART No.		INSTALLATION NOTES
	FIELD	VC IMP.		ST-107#		#Fabricate new mounting bracket.
99	PM	3.2Ω	N-6286	Mod. P5-V		
	CONE DIA.	VC DIA.				
100	4½"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			


A1
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A12
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PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

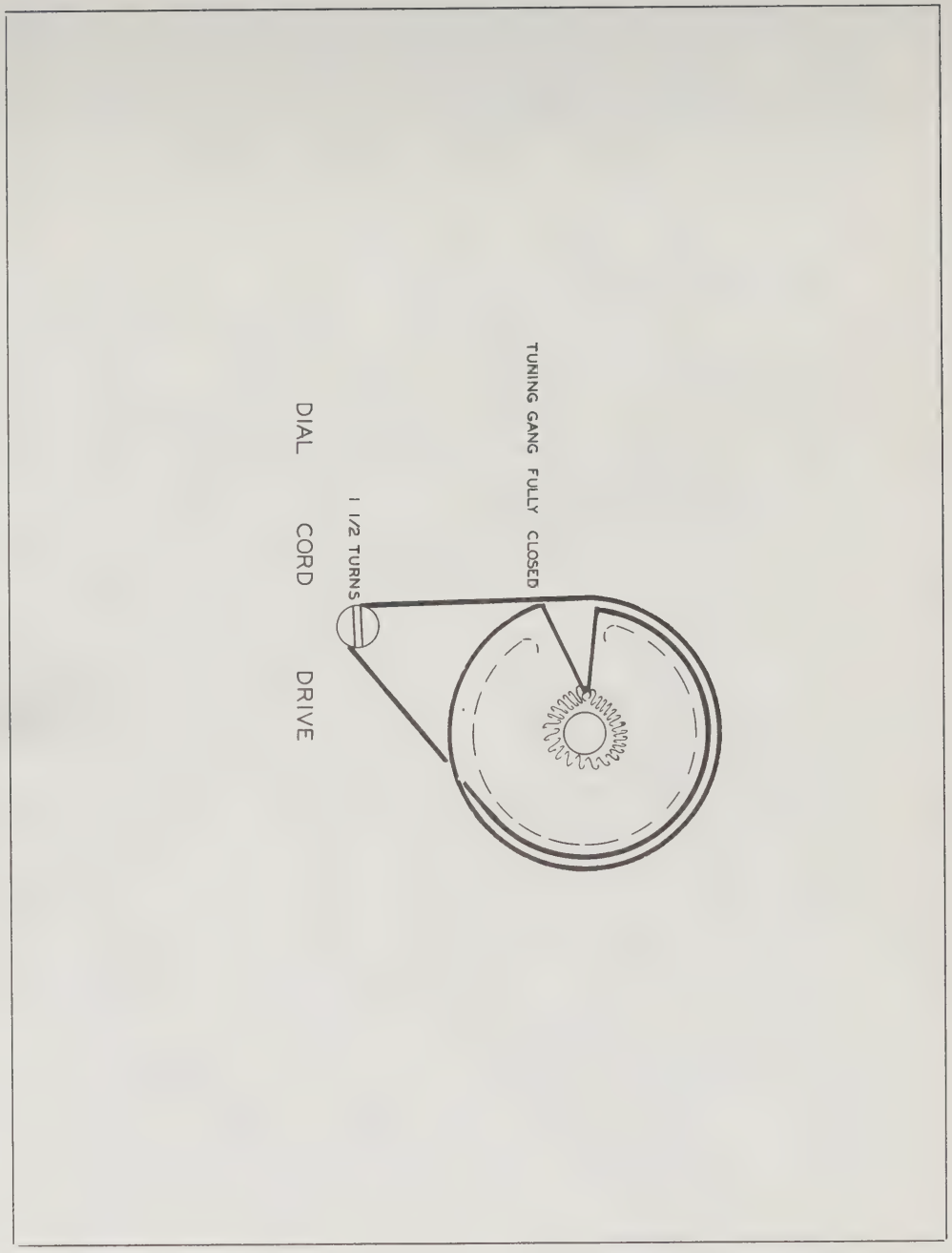
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SONORA PART No.	MEISSNER PART No.	
101	Loop Ant.	0Ω	1.5Ω	N-6343		
102	FM Ant.Coil	0Ω	0Ω	N-6371		
103	FM RF Coil		0Ω	N-6372		
104	AM Osc.Coil	2Ω	5Ω	N-6348	14-1040	
105	FM " "		0Ω	N-6349		
106	Input IF AM	10Ω	10.5Ω	N-6344	16-6668	
107	" " FM	1.5Ω	.1Ω	N-6346		
108	Output IF AM	10.5Ω	10.5Ω	N-6345	16-6669	
109	" " FM	1.5Ω	.1Ω	N-6346		
110	Disc. Trans	2.5Ω	.1Ω	N-6341		Tapped .5Ω
111	Plate Choke		3.5Ω	N-6373		
112	Fil. Choke	5.4Ω	6.1Ω	N-6389		
113	RF Choke		0Ω			

DIAL LIGHT

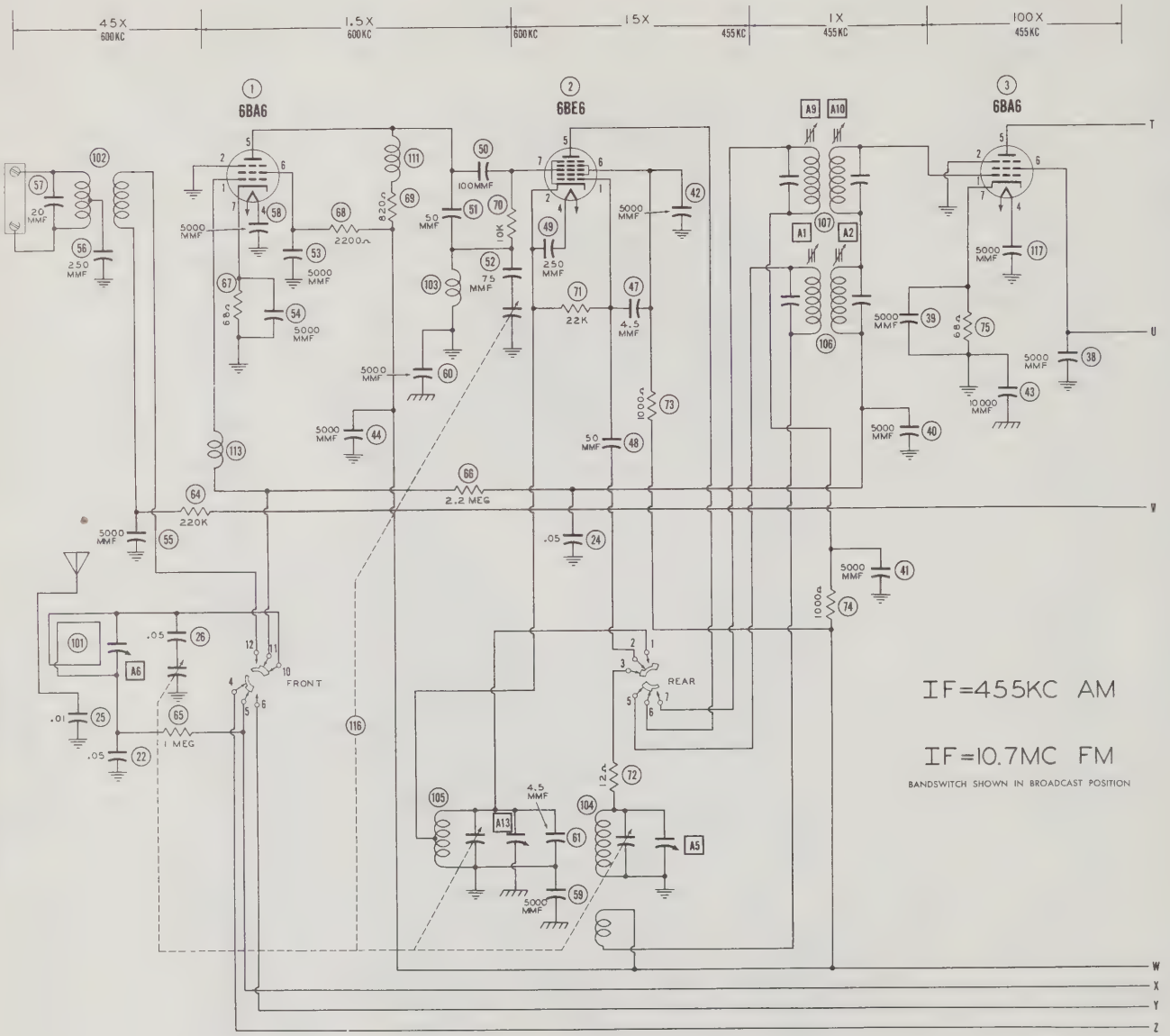
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					SONORA PART No.		
114	Bayonet	6-8	0.15	Brown	N-1147		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
115	Switch	N-6351	Band
116	Tuning Gang	N-6276	AM (12-528MMF, 10-185MMF)
A5	Trimmer	N-6407	AM Osc. Adj.
A6	"	N-6406	AM Ant. Adj.
A13	"	N-6420	FM Osc. Adj.



DATE 7/48 SET #3 FOLDER #433-28



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	[illegible]	.1VAC	0V.	19VAC	25VAC	90VDC	90VDC	.4VDC	-
	2	[illegible]	-11.9VDC	0V.	11.9VAC	19VAC	100VDC	62VDC	0V.	-
	3	[illegible]	0V.	0V.	25VAC	31VAC	98VDC	96VDC	.4V.	-
‡	4	[illegible]	.4V.	0V.	36VAC	31VAC	94VDC	94VDC	1VDC	-
‡	5	[illegible]	0V.	-.9VDC	.4V.	0V.	-.5VDC	0V.	-.5VDC	-
	6	[illegible]	0V.	-.5VDC	0V.	-.3VDC	.3V.	60VDC	5.9VAC	11.9VAC
	7	25L6	0V.	38VAC	105VDC	100VDC	0V.	0V.	60VAC	6.3VDC
	8	25Z6	0V.	117VAC	117VAC	122VDC	117VAC	120VDC	94VAC	122VDC

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

§TAKEN WITH VACUUM TUBE VOLTMETER.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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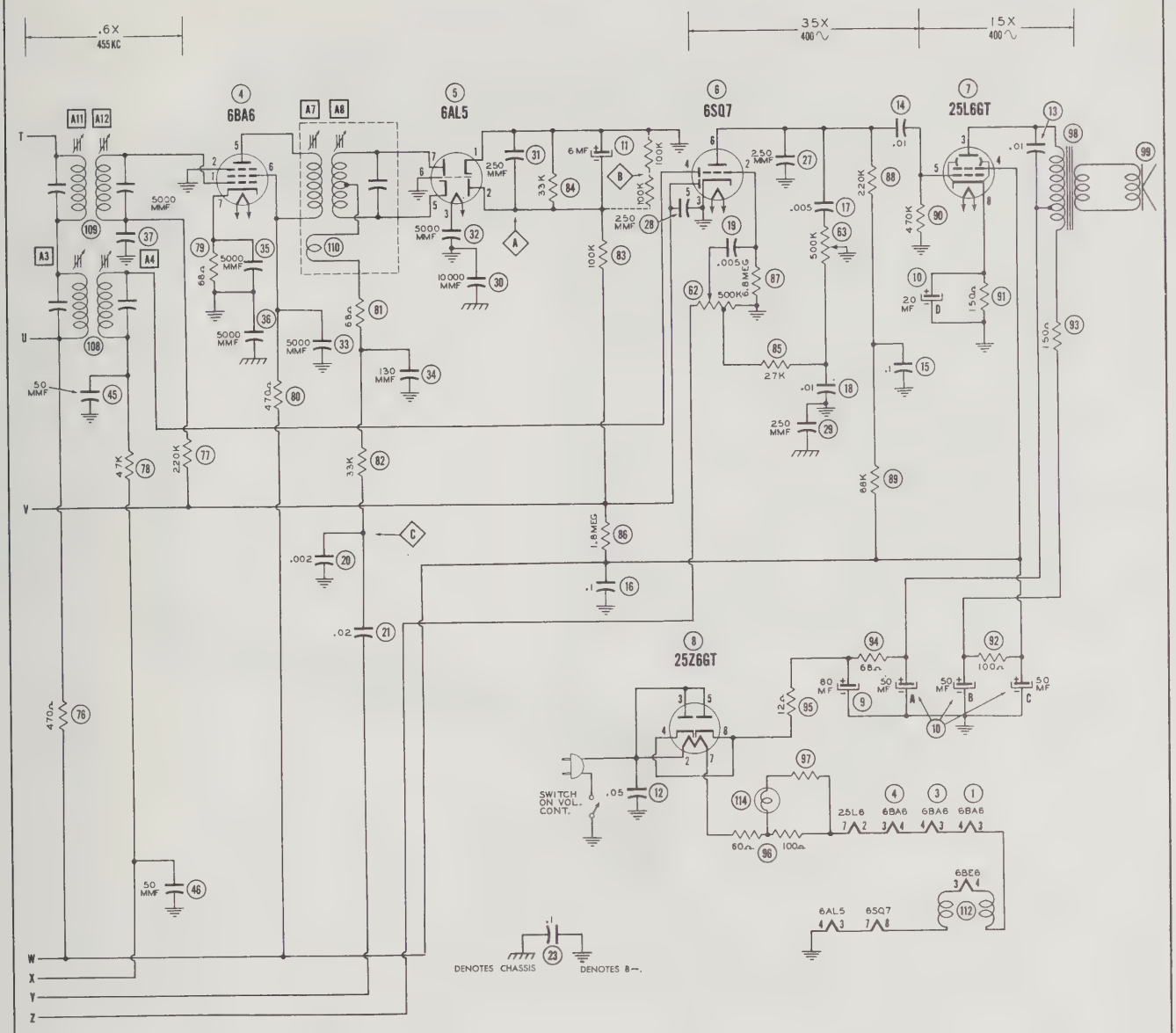
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	6BA6	370KΩ	0Ω	14Ω	19Ω	41KΩ	43KΩ	70Ω	-
	2	6BE6	20KΩ	0Ω	9Ω	14Ω	40KΩ	40KΩ	10KΩ	-
	3	6BA6	4 Meg.	0Ω	19Ω	23.5Ω	40KΩ	40KΩ	70Ω	-
‡	4	6BA6	350KΩ	0Ω	27.5Ω	23.5Ω	40KΩ	40KΩ	70Ω	-
‡	5	6AL5	0Ω	30KΩ	3.5Ω	0Ω	INF.	0Ω	INF.	-
	6	6SQ7	INF.	7 Meg.	0Ω	520KΩ	120KΩ	330KΩ	3.5Ω	9Ω
	7	25L6	INF.	27.5Ω	40KΩ	40KΩ	470KΩ	0Ω	44Ω	150Ω
	8	25Z6	INF.	195Ω	195Ω	40KΩ	195Ω	40KΩ	175Ω	40KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

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RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

483-28

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FM ALIGNMENT

Connect two 100KΩ resistors (Values Within 5%) In Series. Connect [illegible] between A and B- with an RF choke made by wrapping about 20 turns of hookup wire in series with [illegible]. [illegible] is connected as shown. Connect a [illegible] be used. However extreme care must be used to keep reading at zero. [illegible] is left connected throughout entire FM alignment to correct an drift [illegible] generator or local oscillator.

FM DISCRIMINATOR ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
[illegible]	[illegible]	High side to Pin #1 (grid) 6BA6 2nd IF Tube (4). Low side to B-.	10.7MC (unmodulated)	FM (clockwise)	Tuning cap. fully open.	VTVM and microammeter connected as shown in Fig. 1.	A7	Adjust for maximum deflection. Reduce signal generator to give approx. 5 volt reading.
[illegible]	250MMF.	"	"	"	"	"	A8	Adjust for zero reading on microammeter. A8 should not be touched after this step.

PRELIMINARY FM-IF ALIGNMENT

[illegible]	[illegible]	High side to Pin 7 (grid) 6BE6. Low side to B-.	10.7MC (unmodulated)	FM	Tuning cap. fully open.	Meters connected as shown in Fig. 1	A9,A10, A11,A12	Adjust for maximum deflection on VTVM. Attenuate signal to give approx. 5 volt reading. Continue with Step 7 under VTVM or scope alignment.

FINAL FM-IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

7	250MMF.	High side to Pin 7 (grid) 6BE6. Low side to B-.	109MC (unmodulated)	FM	Tuning cap. fully open.	Meters connected as shown in Fig. 1	A13	Adjust for approx. maximum reading on VTVM and exact zero reading on microammeter.
8	250MMF	"	109MC (Freq.Mod. 400~ 25KC deviation)	"	"	"	A9,A10, A11,A12 A7	Adjust for maximum reading on VTVM. Maintain zero reading on microammeter by shifting sig. gen. frequency if necessary. While making adjustments turn up volume. If signal is free of distortion increase deviation to 75KC and repeat adjustments of this step. If done carefully there will be no distortion. If distortion is present repeat Steps 6, 7 and 8. Continue with Step 9.

FINAL FM-IF ALIGNMENT USING FM SIGNAL GENERATOR, VTVM AND OSCILLOSCOPE

Make oscilloscope connections as shown in Fig. 2. If no phase shift is encountered in scope pattern (double trace) the internal 60~ modulation frequency and synchronized sweep voltage of the signal generator may be used. If phase shift is encountered use the variable a-f oscillator in the signal generator (if so equipped) or an external a-f oscillator connected as shown in Fig. 2 for modulating the signal. The variable a-f oscillator can be shifted to give a single trace pattern. Use modulation freq. near 400~.

At all times during alignment keep microammeter at zero by shifting signal generator frequency if necessary.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7	250 MMF	High side to Pin 7 (grid) 6BE6. Low side to B-.	10.7MC (freq.mod. 25KC deviation)	FM	Tuning cap. fully open.	As shown in Fig. 2	A9,A10, A11,A12 A7.	Adjust for maximum reading on VTVM and straight line on scope as shown in Fig. 3.
8	250 MMF	"	10.7MC (freq.mod. 75KC deviation)	"	"	"	A9,A10, A11,A12 A7.	Adjust for maximum reading on VTVM and straight line on scope as shown in Fig. 3. After adjusting, increase deviation to approx. 125KC to 150KC. Pattern as shown in Fig. 3 should be obtained. If not repeat last two steps. Continue with Step 9.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
[illegible]	2 150Ω carbon res.	Across FM dipole terminals.	109MC (unmodulated)	FM	Tuning cap. fully open.	Meters connected as in Fig. 1.	A13	Adjust for approx. maximum reading on VTVM and exact zero center on microammeter.
10	"	"	106MC	"	Tune for maximum deflection on VTVM.	"		Bend slightly FM rotor plates of ant. section of tuning cap. for maximum deflection. Repeat Steps 9 & 10 until no further improvement can be made.
11	"	"	98MC	"	"	"		Bend slightly FM rotor plates of ant. section of tuning cap. for maximum deflection.
12	"	"	90MC	"	"	"		Bend slightly FM rotor plates of ant. section of tuning cap. for maximum deflection. Repeat Steps 10, 11 & 12 until no further improvement can be made.

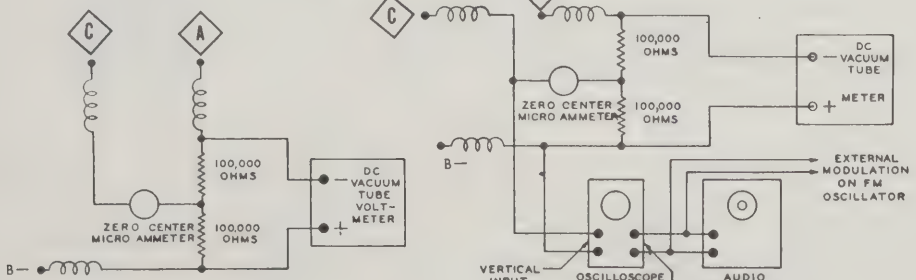

FIG 1

FIG. 2

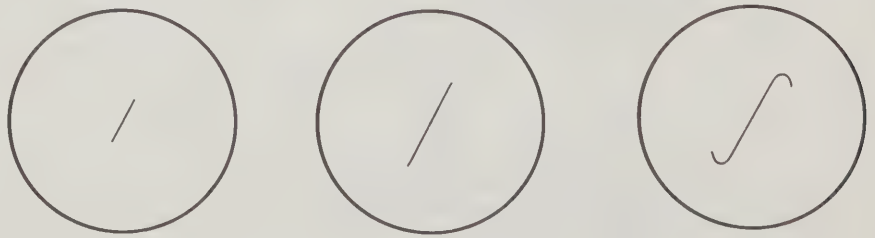

FIG. 3

FOR AM ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.

TRAV-LER MODEL 5029
BATTERY OPERATED

TRAV-LER MODEL 5029
BATTERY OPERATED

TRAV-LER MODEL 5029

TRADE NAME	Trav-Ler Model 5029
MANUFACTURER	Trav-ler Radio & Tel. Corp., 571 W. Jackson, Chicago, Ill.
TYPE SET	Battery Operated Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3S4 or 3V4 Power Output
POWER SUPPLY RATING	1.5 Volts "A" Supply and 67.5 Volts "B" Supply 225MA @ 1.5 Volts DC and 13.2MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

In Step 3 the chassis and batteries must be in their normal position in the cabinet to reflect the proper loop impedance.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	.1 MFD.	"	1400KC	1400KC	"	A5	Adjust for maximum output. Reassemble receiver in cabinet
3		Wrap one turn of high side of sig. gen. around outside of cabinet.	"	Tune for maximum output.		A6	Remove button plug from end of cabinet and adjust A6 for maximum volume.

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DATE 2/48 SET #33 FOLDER #483-29

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4A	Power Output	3S4	3S4	7BA	
B	" "	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRAV-LER PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5	10	75		M-10-150	UT-121	PRSA150-12	BR1215	Filter*
6	.005	600	PC-6	S-6-005	TC-25	684-005	DT6D5	Output Plate Bypass
7	.005	600	PC-6	S-6-005	TC-25	684-005	DT6D5	Audio Coupling
8	.01	400	PC-7	S-4-01	TC-11	484-01	DT4S1	AF Screen Bypass
9	.005	600	PC-6	S-6-005	TC-25	684-005	DT6D5	Audio Coupling
10	.01	400	PC-7	S-4-01	TC-11	484-01	DT4S1	AVC Filter
11	.01	400	PC-7	S-4-01	TC-11	484-01	DT4S1	Conv. Screen Bypass
12	100		MC-2	MO.5-31	1FM-31	1468-0001	5W5T1	AF Plate Bypass
13	100		MC-2	MO.5-31	1FM-31	1468-0001	5W5T1	Diode RF Filter
14	100		MC-2	MO.5-31	1FM-31	1468-0001	5W5T1	Osc. Grid Cap.

*May use part #EC-7, 20 MFD. @ 80 volts.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
15	1 Meg.	½	VC-8			Volume Control & Sw.

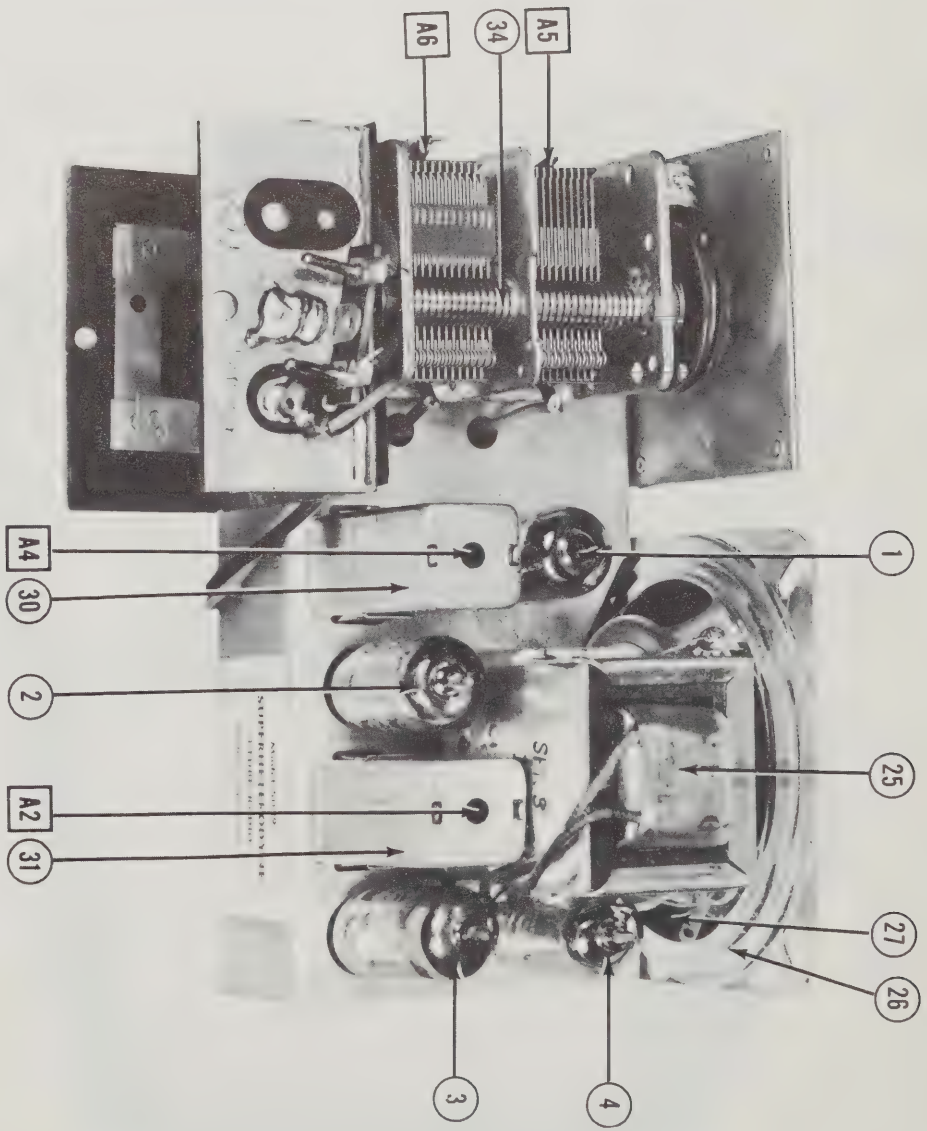
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	IDENTIFICATION CODES
16	220KΩ	½	1R-20	BTS-220K	Red-Red-Yl. Oscillator Grid
17	3.3 Meg.	½	1R-23	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
18	10KΩ	½	1R-37	BTS-10K	Br.-Blk.-Or. Converter Screen Decoupling
19	82KΩ	½	1R-31	BTS-82K	Gray-Red-Or. Diode RF Filter
20	10 Meg.	½	1R-3	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
21	3.3 Meg.	½	1R-23	BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen Dropping
22	1 Meg.	½	1R-12	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
23	2.2 Meg.	½	1R-13	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
24	680Ω	½	1R-39	BTS-680	Blue-Red-Br. Bias

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TRAV-LER PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
25	3700Ω	3.2Ω	410Ω	.7Ω	Part of SPK-8	A-3876†	T32S46†	A-2900†	†Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRAV-LER PART No.	JENSEN PART No.		
	FIELD	VC IMP.				
26	PM	3.2Ω	SPK-8			
	CONE DIA.	VC DIA.				
27	3-7/16"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

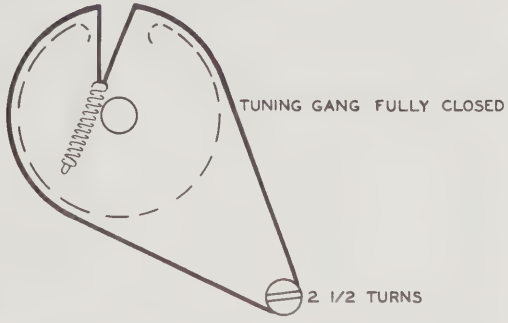
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRAV-LER PART No.	MEISSNER PART No.	
28	Loop Ant.		1.3Ω	LL13		
29	Osc. Coil	1.2Ω	7.2Ω	LO12		
30	Input IF	22Ω	22Ω	LI5	16-6668	
31	Output IF	22Ω	22Ω	LI5	16-6669	

BATTERIES

ITEM No.	VOLTAGE	TRAV-LER PART No.	EVEREADY			INSTALLATION NOTES
			"A"	"B"	"A-B"	
32	1.5 V "A"		#950			2 Used in parallel
33	67.5V "B"			#467		

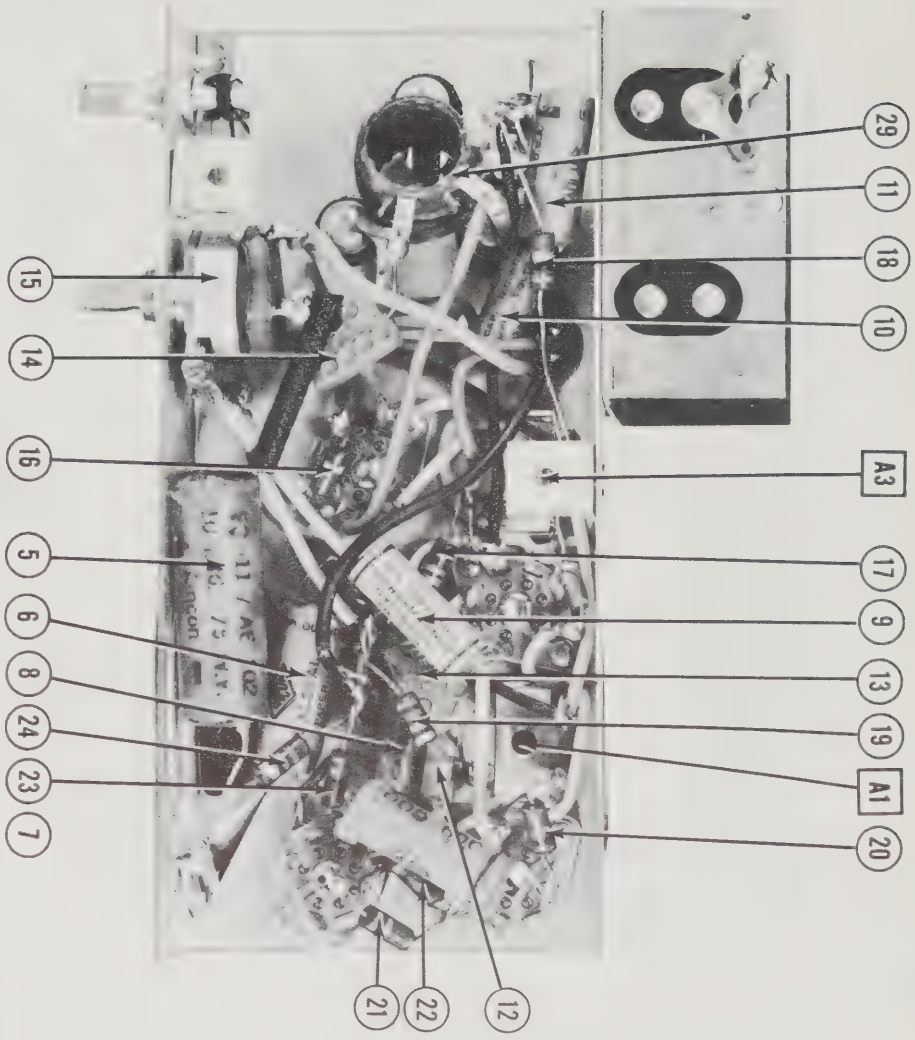
MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
34	2 Gang Var. Cap	GC-4	(50-216 MMF, 37-468 MMF)
A6	Trimmer	TC-7	Ant. Adj.

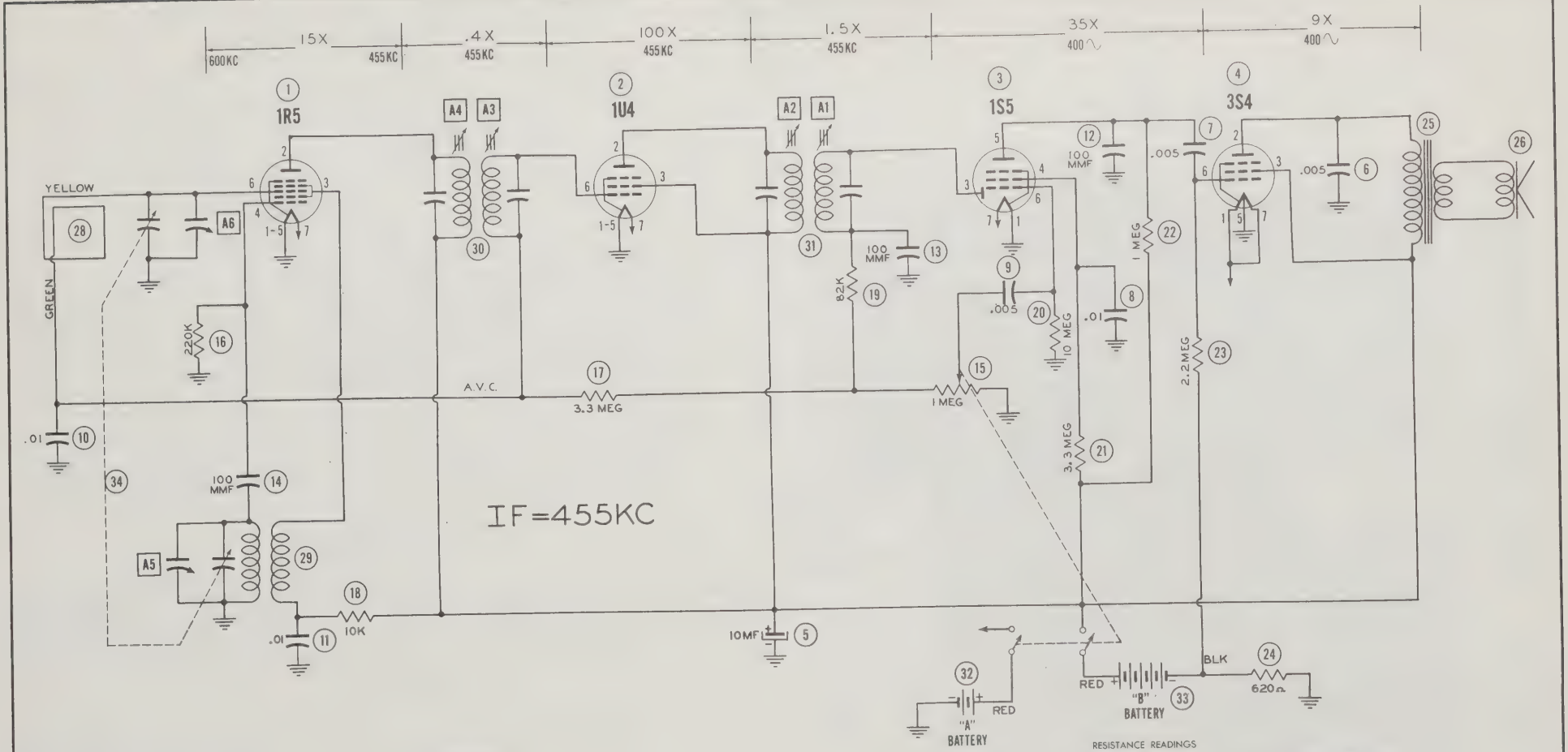


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



TRAV-LER MODEL 5029
BATTERY OPERATED



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	64VDC	49VDC	-10.5VDC§	0V.	0V.	1.4VDC
2	1U4	0V.	64VDC	64VDC	0V.	0V.	0V.	1.4VDC
3	1S5	0V.	0V.	-.1VDC	13.9VDC	10VDC	0V.	1.4VDC
4	3S4	1.4VDC	62VDC	-.4VDC	64VDC	0V.	62VDC	1.4VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	55KΩ	65KΩ	180KΩ	*	4 Meg.	*
2	1U4	*	55KΩ	55KΩ	4 Meg.	*	4 Meg.	*
3	1S5	*	INF.	1 Meg.	3.5 Meg.	1 Meg.	10 Meg.	*
4	3S4	*	55KΩ	2.2 Meg.	55KΩ	*	55KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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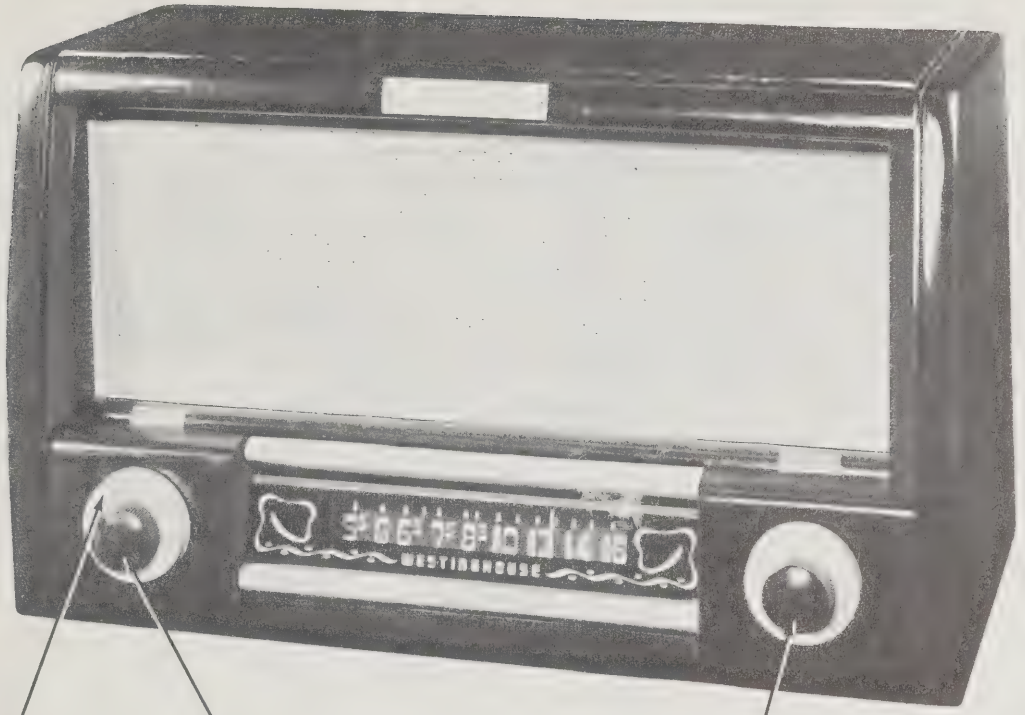
483-29

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

WESTINGHOUSE MODEL
H-157 (Ch. V-2122)



WESTINGHOUSE MODEL
H-157 (Ch. V-2122)

WESTINGHOUSE MODEL H-157

TRADE NAME	Westinghouse, Model H-157 (Ch. V-2122)
MANUFACTURER	Westinghouse Electric Corp., Receiver Div., Sunbury, Pa.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Ant.
TUBES (SIX)	Types, 6SA7 Converter, 6SF7 IF Amp.-Det.-AVC, 6SC7 AF Amp.-Phase Inv., (2) 25L6GT Power Output, 25Z6GT Rectifier.
POWER SUPPLY	105-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC

RATING .46 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 2 (grid) 6SF7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.1 MFD.	High side to Pin 8 (grid) 6SA7. Low side to B-.	"	"	"	A3, A4	Adjust for maximum output.
3	200MFD.	High side to ext. ant. lead. Low side to B-.	"	"	"	A1, A2, A3, A4.	" " " "
4	200MFD.	"	1615KC	"	"	A5	Adjust for maximum output. Install receiver in cabinet.
5		Loop	1400KC	Tune for maximum output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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DATE 2/48 SET #33 FOLDER #483-31

PARTS LIST AND DESCRIPTIONS

WESTINGHOUSE
MODEL H-157

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	6SA7	6SA7	8R	
2	IF Amp. Det.-AVC	6SF7	6SF7	7AZ	
3	AF Amp.-Inv.	6SC7	6SC7	8S	
4	Power Output	25L6GT	25L6GT	7AC	
5	" "	25L6GT	25L6GT	7AC	
6	Rectifier	25Z6GT	25Z6GT	7X	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: WESTINGHOUSE PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	30	150	V-3304	DSB-5030-150	TA-530		EDL5315	Filter - Green
B	50	150						" - Red
8	.05	400	RCP10W4503A	MPH-4-05	TC-15	484-05	DT4S5	Rectifier Bypass
9	.01	400	RCP10W4103A	S-4-01	TC-11	484-01	DT4S1	Output Plate Bypass
10	.01	400	RCP10W4103A	S-4-01	TC-11	484-01	DT4S1	" " "
11	.01	400	RCP10W4103A	S-4-01	TC-11	484-01	DT4S1	Audio Coupling
12	.01	400	RCP10W4103A	S-4-01	TC-11	484-01	DT4S1	" "
13	.1	400	RCP10W4104A	S-4-1	TC-1	484-.1	DT4P1	RF Bypass Pwr. Supply
14	.005	600	RCP10W6502A	S-6-005	TC-25	684-005	DT6D5	Audio Coupling
15	.01	400	RCP10W4103A	S-4-01	TC-11	484-01	DT4S1	Tone Comp.
16	.05	400	RCP10W4503A	S-4-05	TC-15	484-05	DT4S5	AVC Filter
17	.05	400	RCP10W4503A	S-4-05	TC-15	484-05	DT4S5	" "
18	.2	400	RCP10W4204K	S-4-2	TC-2	484-.2	DT4P2	Line Isolation
19	.05	400	RCP10W4503A	S-4-05	TC-15	484-05	DT4S5	Conv. Screen Bypass
20	.1	400	RCP10W4104A	S-4-1	TC-1	484-.1	DT4P1	Tuning Cap. Isolation
21	.01	400	RCP10W4103A	S-4-01	TC-11	484-01	DT4S1	Ext. Ant. Isolation
22	300		RCM20A301M	MO.5-33	MS-33	1468-0003	5W5T3	AF Plate Bypass
23	68		RCM20A680M	MOS.5-47	MS-47	1469-00007	5W5Q7	Osc. Grid Cap.

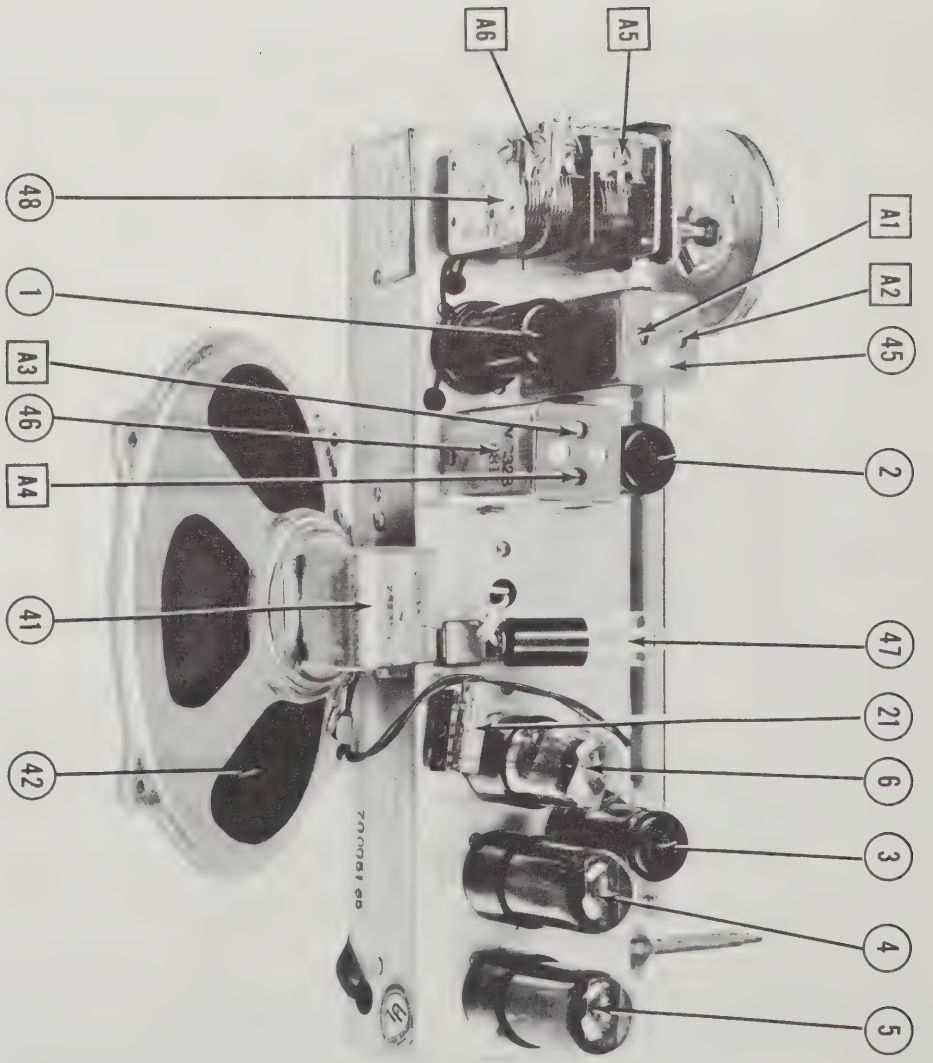
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WESTING. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
24	1 Meg-1 Meg.	½	V-4982			Volume & Tone Controls Sw.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WESTINGHOUSE PART No.	IRC PART No.	IDENTIFICATION CODES
25	22KΩ	¼	RC10AE223M	BTS-22K	Red-Red-Or. Oscillator Grid
26	22KΩ	¼	RC10AE223M	BTS-22K	Red-Red-Or. AVC Network
27	3300Ω	¼	RC10AE332M	BTS-3300	Or.-Or.-Red Converter Screen Dropping
28	220KΩ	¼	RC10AE224M	BTS-220K	Red-Red-Yl. Line Isolation
29	2.2 Meg.	¼	RC10AE225M	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
30	10 Meg.	¼	RC10AE106M	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
31	220KΩ	½	RC20AE224K	BTS-220K	Red-Red-Yl. AF Plate Load
32	180KΩ	½	RC20AE184K	BTS-180K	Br.-Gray-Yl. Phase Inverter Plate Load
33	82KΩ	¼	RC10AE823K	BTS-82K	Gray-Red-Or. Phase Inverter Grid
34	270KΩ	¼	RC10AE274K	BTS-270K	Red-Vi.-Yl. Output Grid
35	330KΩ	¼	RC10AE334K	BTS-330K	Or.-Or.-Yl. Output Grid
36	91Ω	1	RC30AE910J	BW-1-82	White-Br.-Blk. Output Cathode
37	1500Ω	2	RC40AE152M	BT-2-1500	Br.-Grn.-Red Filter
38	22Ω	½	RC20AE220M	BW-½-22	Red-Red-Blk. Rectifier Ballast
39	75Ω	10	V-4994		Line Dropping

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		WESTING. PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
40	5200Ω CT	3.6Ω	260Ω CT	.4Ω	V-3297	A-3823	T22S46	A-2900	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			WESTING. PART No.	JENSEN PART No.		
41	FIELD	VC IMP.	V-5034			
	PM	3.6Ω				
42	CONE DIA.	VC DIA.	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			
	4-7/8" x 7"	5/8"				

R F COILS

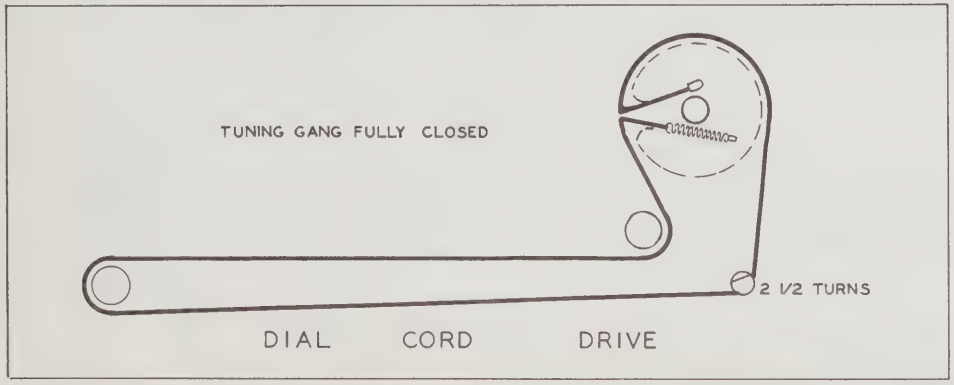
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	WESTINGHOUSE PART No.	MEISSNER PART No.
43	Loop Ant.	.3Ω	1.3Ω	V-5031	
44	Osc. Coil		4.3Ω	V-3382	14-1040
45	Input IF	29Ω	27Ω	V-3328	16-6658
46	Output IF	21Ω		V-3329	16-6670

DIAL LIGHT

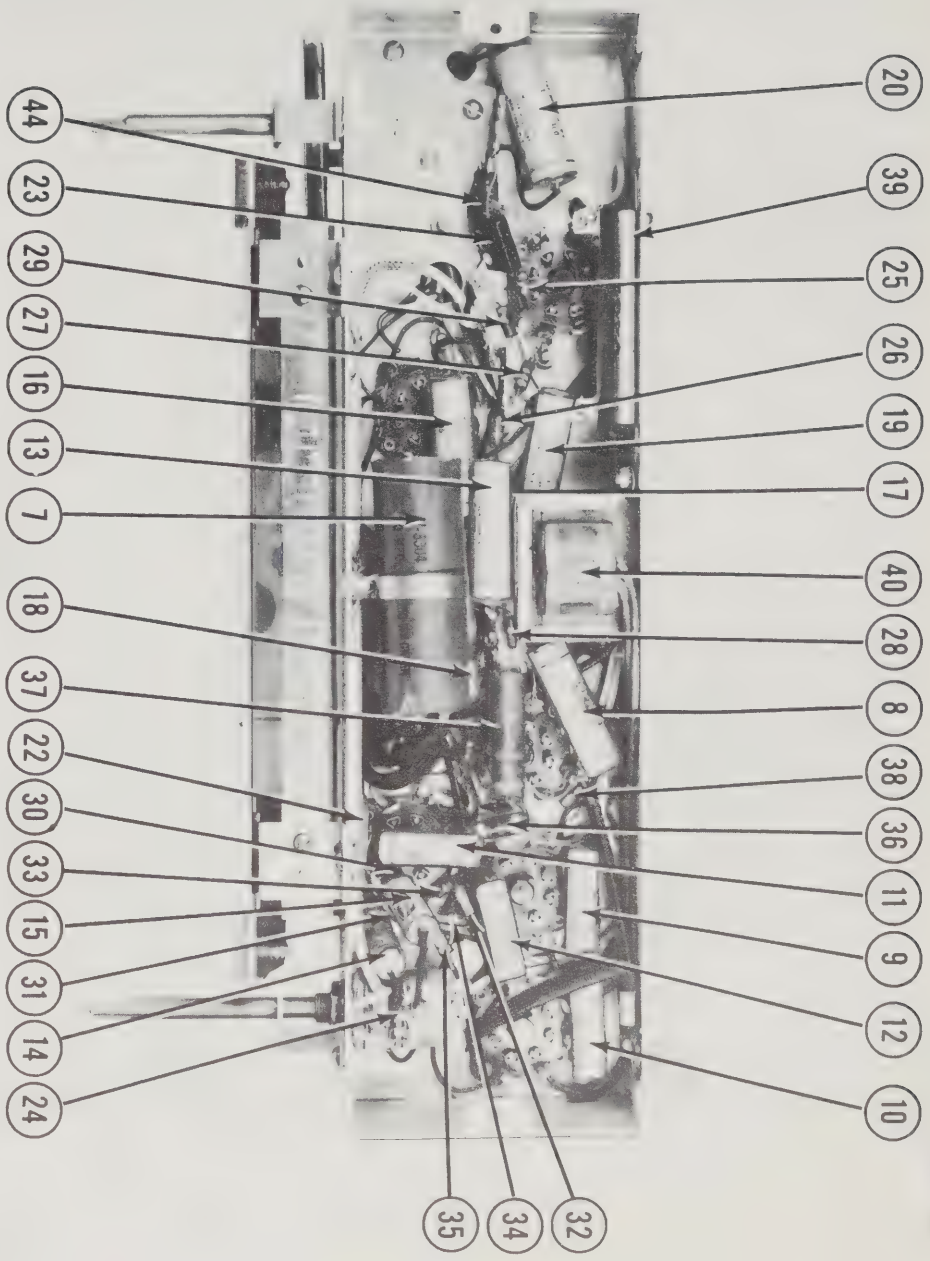
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					WESTINGHOUSE PART No.		
47	Screw	120			6S6		Type C7

MISCELLANEOUS

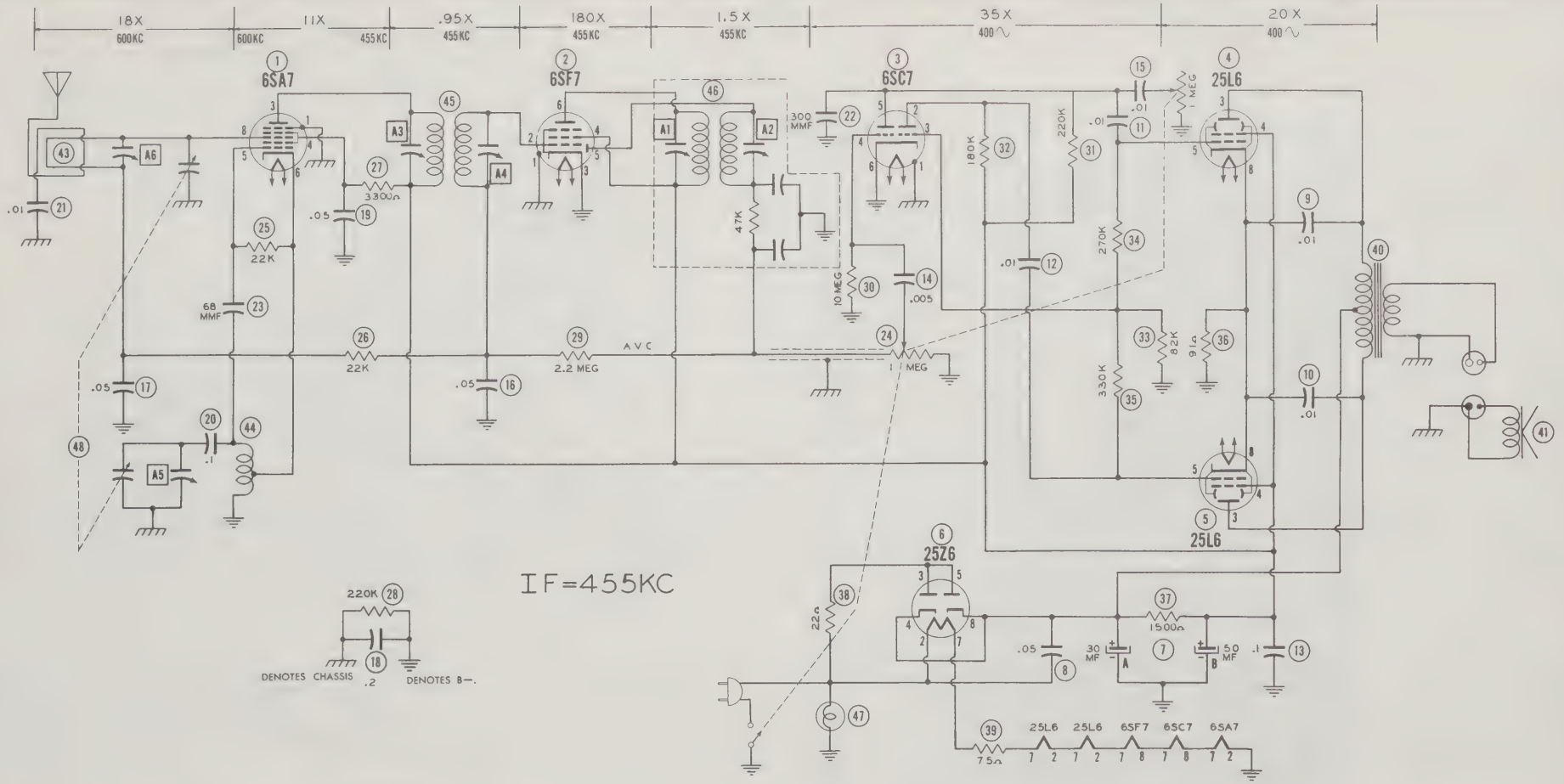
ITEM No.	PART NAME	WESTINGHOUSE PART No.	NOTES
48	2 Gang Var. Cap.	V-4993	(16-404MMF, 23-133 MMF)
A6	Trimmer	V-4992	Ant. Adj.
	Dial Scale	V-4983	
	Plate	V-5033	Front Glass
	Dial Pointer	V-4986	



CHASSIS—BOTTOM VIEW



DATE 2/48 SET #33 FOLDER #453-31
MODEL H-157



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0V.	0V.	87VDC	87VDC	-11VDC§	0V.	6.4VAC	-.4VDC
2	6SF7	0V.	-.4VDC	0V.	87VDC	-.5VDC	87VDC	19.5VAC	13VAC
3	6SC7	0V.	31VDC	-.6VDC	-.6VDC	48VDC	0V.	13VAC	6.4VAC
4	25L6	0V.	46.5VAC	117VDC	87VDC	-.2VDC	0V.	70VAC	5.8VDC
5	25L6	0V.	19.5VAC	117VDC	87VDC	-.2VDC	0V.	46.5VAC	5.8VDC
6	25Z6	0V.	117VAC	115VAC	121VDC	115VAC	121VDC	92.5VAC	121VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	220KΩ	0Ω	60KΩ	63KΩ	22KΩ	.5Ω	5Ω	4 Meg.
2	6SF7	220KΩ	4 Meg.	0Ω	60KΩ	1 Meg.	60KΩ	13.5Ω	0Ω
3	6SC7	220KΩ	240KΩ	82KΩ	10 Meg.	280KΩ	0Ω	3Ω	4Ω
4	25L6	INF.	28Ω	60KΩ	60KΩ	350KΩ	0Ω	4.5Ω	95Ω
5	25L6	INF.	13.5Ω	60KΩ	60KΩ	440KΩ	INF.	2.5Ω	95Ω
6	25Z6	INF.	95Ω	115Ω	60KΩ	115Ω	60KΩ	3.0Ω	60KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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483-31

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

TOP VIEW

AVIOLA
MODEL 100

AVIOLA
MODEL 100

GENERAL INFORMATION

This changer is designed to play and automatically change a series of up to ten 10-inch or 12-inch records, not intermixed. It operates on 115 volts, 60 cycle, alternating current. For 50 cycle operation special motor pulley bushings are supplied to dealers.

Non-standard records, such as home recordings, children's records, and records that have no eccentric stopping groove may be played manually. The last record will continue to be replayed until the changer is turned off.

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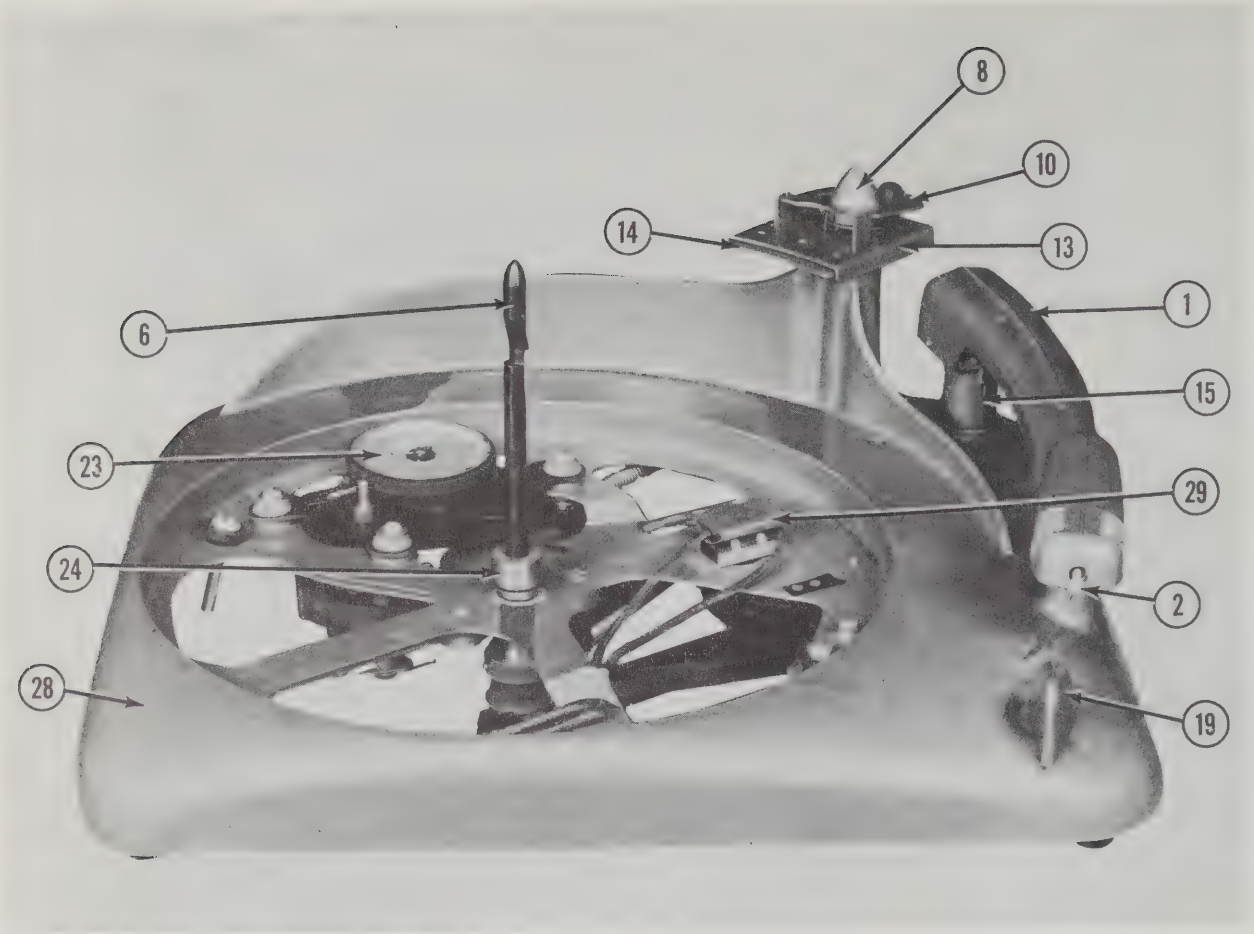
2/48 Set 33 Folder 483-32



TOP VIEW LESS TURNTABLE

OPERATING INSTRUCTIONS

Either one or two detents will be found on the upper front of the pickup arm base (15). A small steel ball inside the detent bearing assembly (15A) engages one of these detents. If there are two detents one will be marked "A," and the other "H." Detent "A" should be engaged by the detent bearing for automatic operation of the pickup arm and changer mechanism, and detent "H" for manual operation.

To reposition the detent bearing hold up pickup arm (1) so the detents may be seen and turn the pickup arm while holding the base in its original position. If only one detent is present, it is the "A" detent and the detent bearing should be disengaged for manual operation. If such is the case, to disengage the bearing for manual operation, the pickup arm should be moved toward the turntable spindle so that the bearing is in a clockwise direction from the detent.

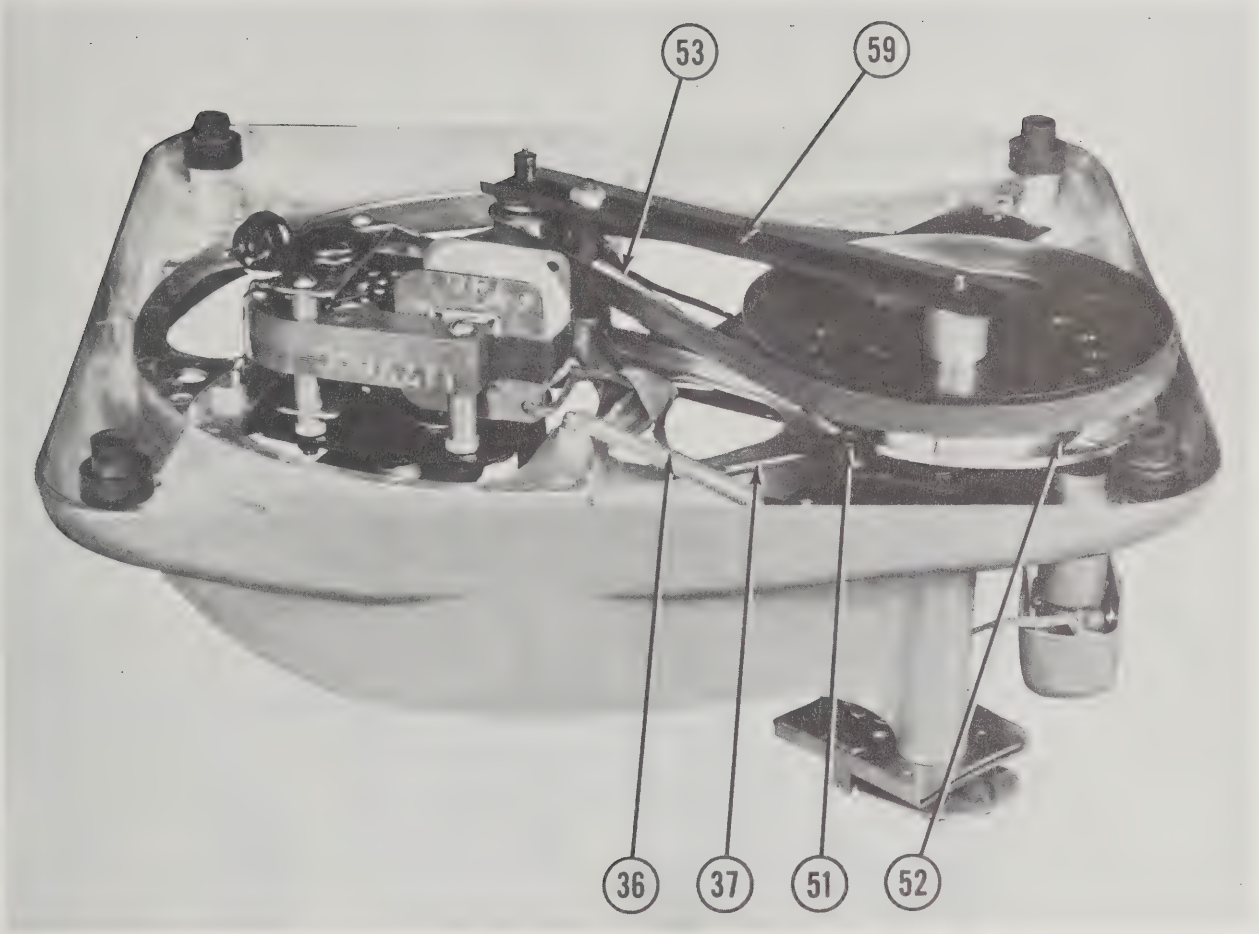
The assembly of the record support shelf (14) and ejector plate (13) should be rotated so that the long side of the record shelf is towards the turntable for 10-inch records. For 12-inch records, rotate the plate so that the short side is toward the turntable.

To place a stack of records on the spindle and the record shelf, first turn the record pressure plate (10) over toward the back of the changer. After the records are loaded, the pressure plate should be placed on top of the records in order to provide the necessary tension to allow the records to drop correctly.

Turn the control knob counter-clockwise to start the motor and turntable. Changing action should also occur; if not turn the control knob counter-clockwise again. The bottom record should drop and the pickup arm should position on the edge of the record.

A record may be rejected at any time during playing by turning the control knob counter-clockwise.

To turn the changer off, raise the pickup arm, place it on its rest and turn the control knob clockwise. *Caution:—Do not turn the changer off or move the pickup arm while the arm is in motion.*



BOTTOM VIEW—BACK

Wait until the arm is lowered in playing position.

Use only good, unwarped records for automatic playing, and do not mix 10-inch and 12-inch records. Records should not be stored on the changer. The crystal pickup may be damaged if the pickup arm is dropped on a record.

To operate the changer manually the record support should be rotated to the 12-inch record position. Provision is not made, in manual operation, to render completely inoperative the trip mechanism which causes cycling. Although the manual position of the detent bearing will prevent cycling caused by the eccentric stopping groove, the mechanism will still cycle when the control knob is turned counter-clockwise. Since the pickup arm should not be handled while in motion during the changing process, each time a record is played the pickup arm should be allowed to completely raise and lower before it is placed on the record.

THE CHANGE CYCLE

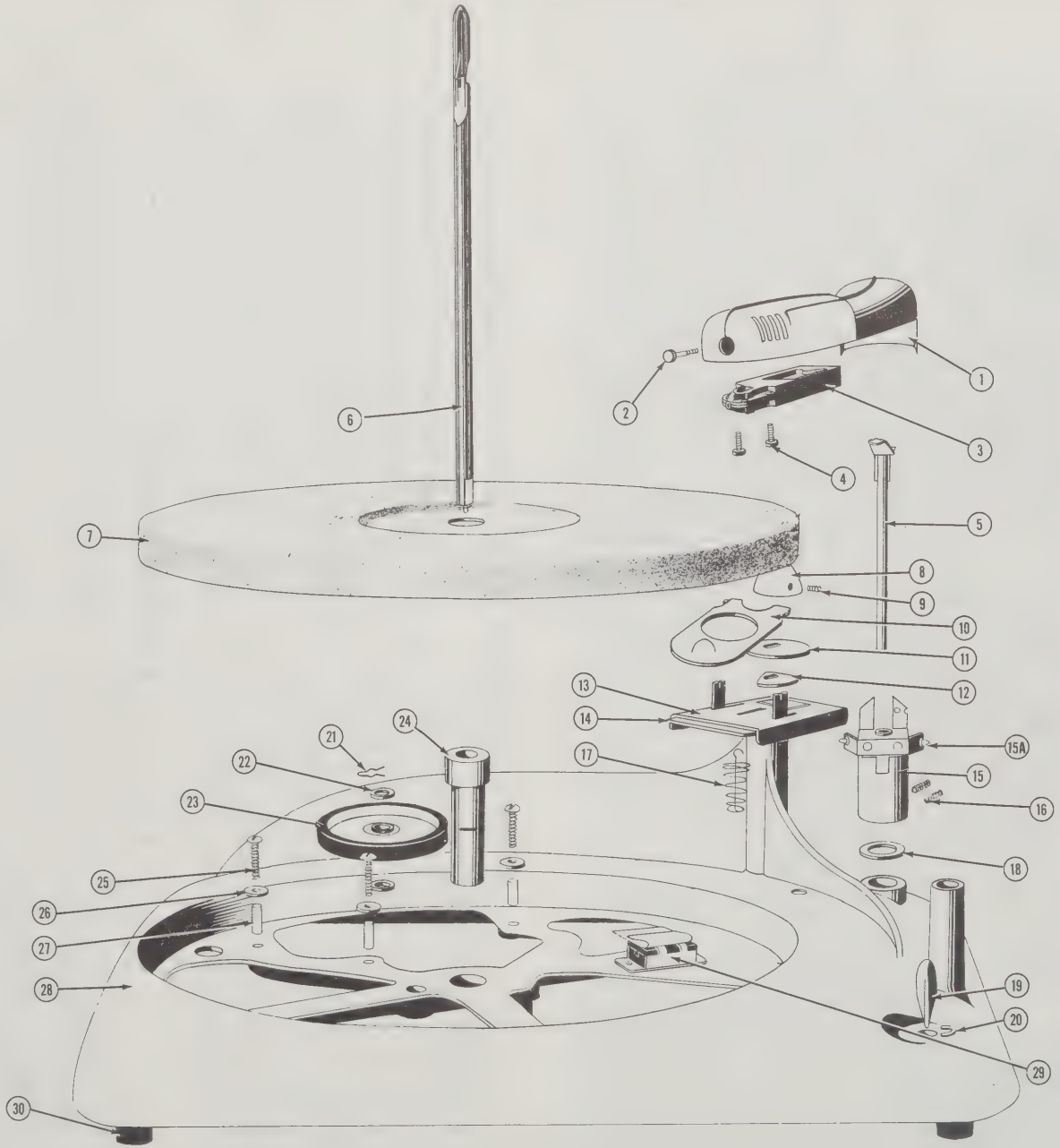
During the change cycle the pickup arm is raised from the record and moved toward its rest, the next record is ejected, and the pickup arm is lowered in the starting groove of the record.

The revolving drum (56) is driven by the drive belt (57) from the pulley bearing (41), which revolves with the turntable.

During the change cycle the release bracket assembly (46) releases the the cam assembly dog (55) so that it is able to fall and engage one of the bosses of the revolving drum (56). The drum then drives the cam assembly (52) which controls the functions of the change cycle. After a complete revolution of the cam, the drive dog (55) is returned to its original position where it is caught by the release bracket (46) and held up away from the drum (56) so that it can no longer drive the cam until the release bracket is again tripped.

The release bracket holds the drive dog with the aid of a spring (45). It is tripped so that the dog is released through one of two means: by the reject lever (34), or by the pickup arm positioning shaft assembly (4).

If the control knob is turned counter-clockwise, the reject lever (34) is moved by the control knob shaft assembly (38) so that it turns on the switch (29), which is in the motor circuit. At the same time,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A PHOTOFACT "EXPLODED" VIEW
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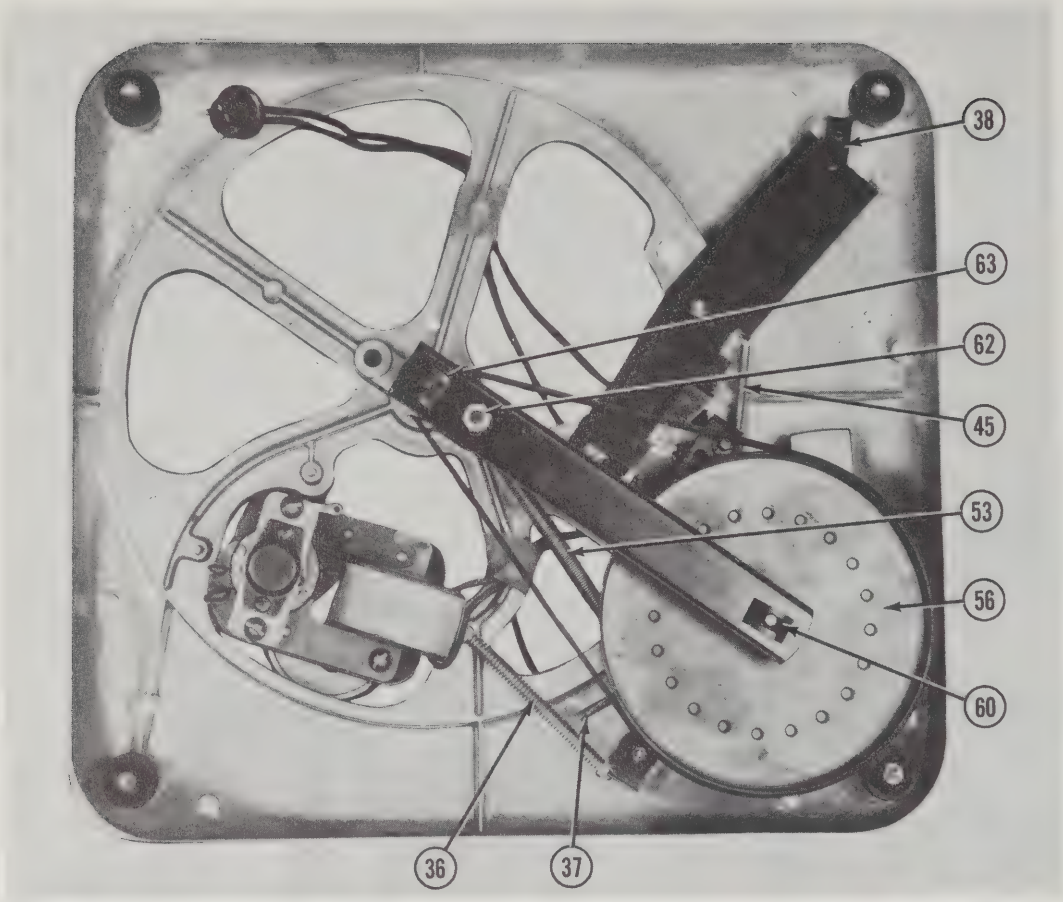


BOTTOM VIEW

and at any time that the control knob is turned counter-clockwise, a bend of the reject lever will strike the release bracket, causing it to pivot and drop the drive dog.

The pickup arm positioning shaft assembly (40) rotates with the pickup arm base (15). As the pickup arm nears the end of a record the lever which has a serrated end (a part of 40) engages the small trip dog (46A). The eccentric stopping groove in the record will cause the pickup arm to oscillate. The backward movement of the pickup arm and the lever (a part of 40) causes the trip dog (46A) to push against its pivot point, causing the release bracket to drop the drive dog.

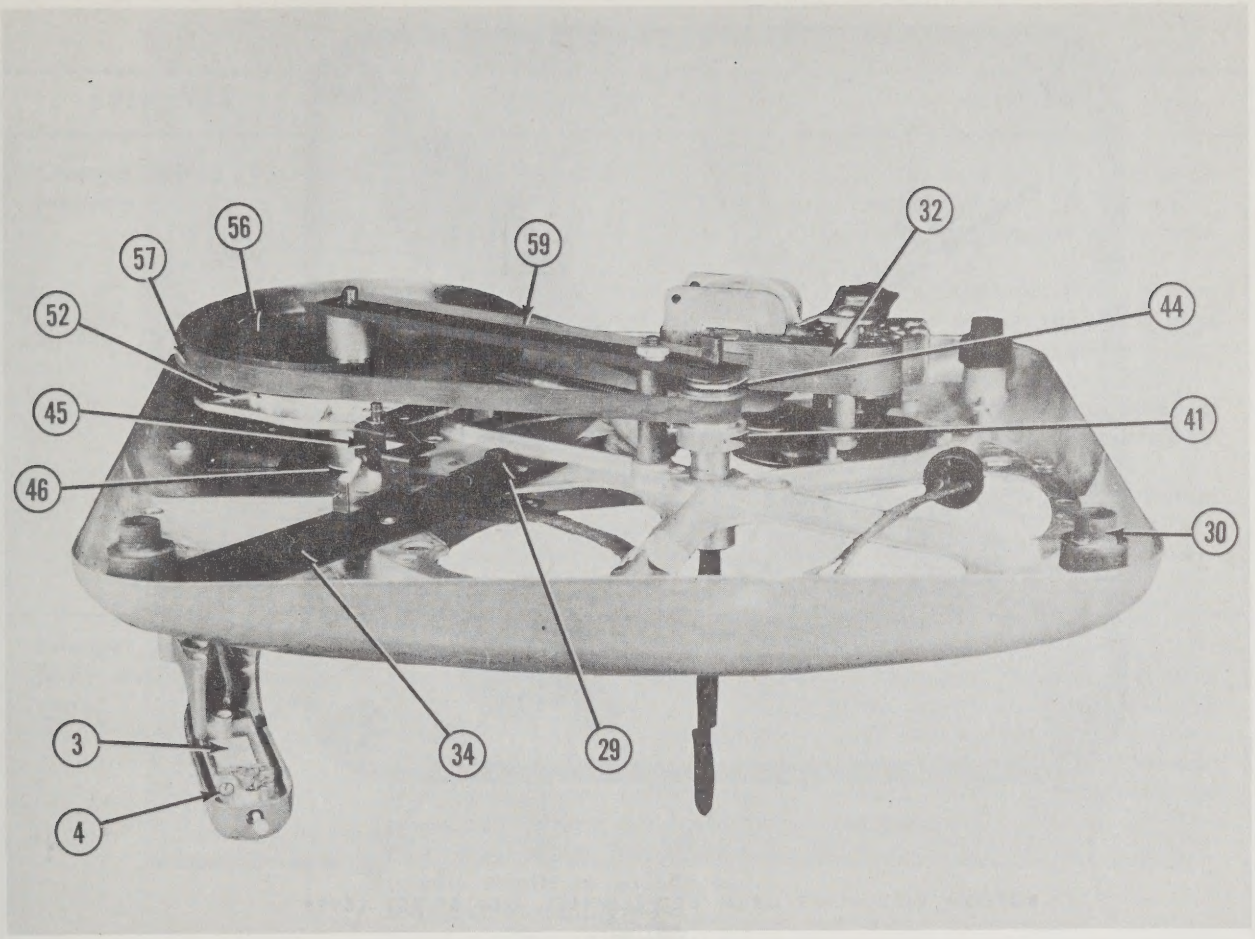
As the cam (52) rotates with the drum during the change cycle, the pickup arm lift shaft (5) rides up an incline to a ledge on the periphery of the cam. This raises the pickup arm off the record. During the remainder of the change cycle the lift shaft rides this ledge, keeping the pickup arm elevated, until the changing is complete.

A follower stud (40A) on the pickup arm positioning lever (40) is pulled into a groove on the cam at the beginning of the cycle. As the cam rotates, the stud follows the groove and causes the pickup arm to swing out beyond the edge of the records during the time that a record is being ejected, and return it to a position over the outside edge of the record afterwards.

The shape of the cam (52) is elliptical at one portion of the outer edge. The roller (51) attached to the ejector lever and shaft (49) follows the outside edge of the cam, with tension applied by its spring (53). As the cam revolves, the elliptical portion pushes against the roller and causes the lever (a part of 49) to move, thereby turning the shaft (49). The shaft extends up to the ejector plate (13). The ejector eccentric (12) is turned by the shaft (49) and moves the ejector plate (13) so that it pushes a record off the shelf. As the main cam continues to revolve, the roller (51) rides around the elliptical portion of the cam, back to its original position, returning the shaft (49), the ejector eccentric (12) and the ejector plate (13) to their original positions.

The index shaft and cam (33) can be rotated by the record support shelf (14) and controls the difference in the movement of the pickup arm positioning lever (a part of 40) between the 12-inch and 10-inch record positions. The cam (33) is eccentric and has two notches. According to the position of the record support shelf (14) one of these notches is engaged by the index lever (35) through the slot in the pickup arm positioning lever (40) and the aid of the index spring (36).

The tension applied to the pickup arm positioning lever (40) by the spring (37) leads the pickup arm toward the center of the record during playing.



BOTTOM—FRONT VIEW

SERVICE AND ADJUSTMENTS

Before attempting to make any adjustments or replacements of parts on a changer, examine the records being used. Faulty records are frequently the source of trouble in these mechanisms. The machine will handle all 10-inch and 12-inch records in reasonable condition, but it cannot function properly with records that are too large or too small in diameter, too thick or too thin, or which are chipped, especially around the center hole.

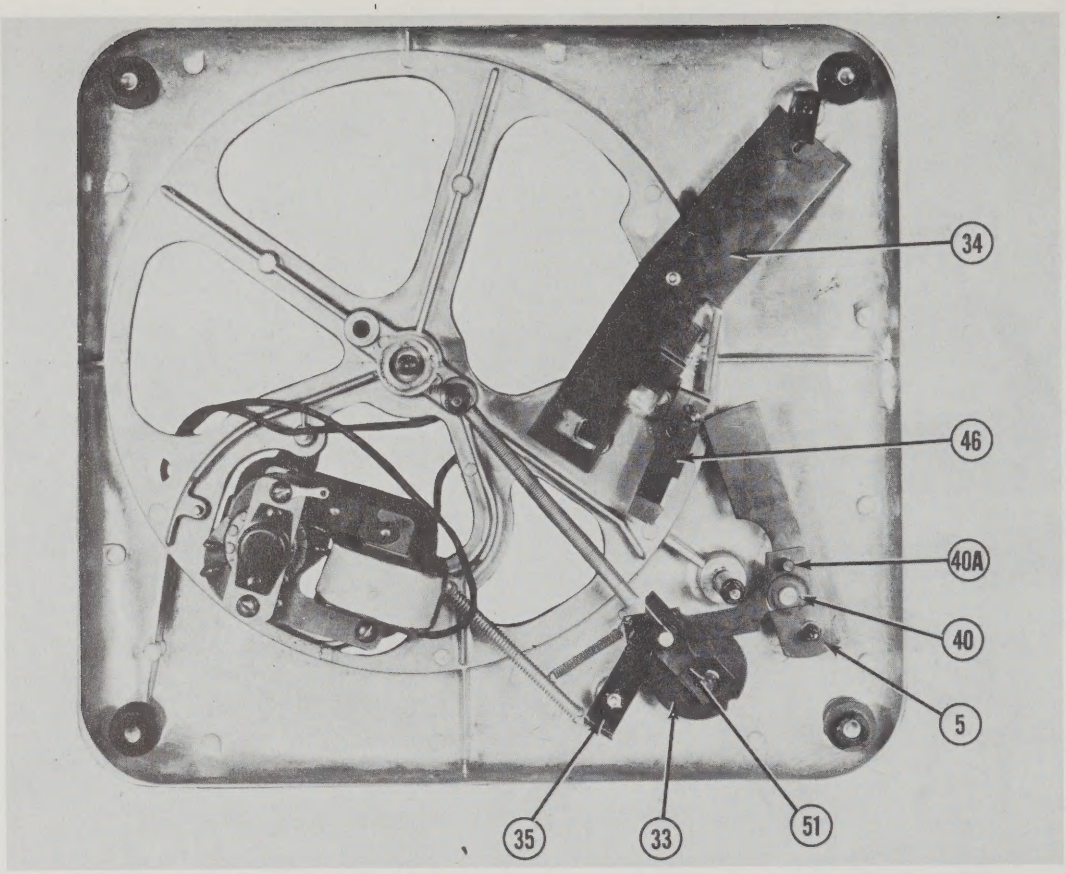
Check all parts and springs to see if they are in place and in good condition before attempting any adjustment. Springs may go dead, set screws may work loose, rivets may have loosened, or levers may be bent due to improper use.

Adjustment of Pickup Arm Positioning

If the pickup arm is not landing correctly on the edge of the records, the adjustment of the pickup arm support (15) on the shaft of the pickup arm positioning assembly (40) is incorrect. Position the record shelf (14) for 10-inch records, and the detent bearing (15A) for automatic operation. Place a standard 10-inch record on the turntable and start the change cycle. Stop the mechanism, while still in cycle, just as the pickup arm begins to descend on the record. At this point the pickup arm follower stud (40A) will still be securely held by the groove in the cam (52) thus retaining all the working parts in their correct relationship. Loosen the two set screws (16) on the pickup arm base. Push upward on the pickup arm shaft (40) from beneath the base plate and hold it tightly against the base plate. On the top insert a .005″ shim underneath the pickup arm support (15) to obtain the necessary clearance between it and its mounting.

The pickup arm positioning shaft (40) has a flat side at the point where the two screws (16) tighten against it for correct adjustment. After the shim has been inserted both screws should be tightened against the flat side of the shaft. Final adjustments to position the pickup arm correctly over the first groove of the record are made by loosening one screw slightly and tightening the other. The pickup arm will move toward the screw that is being tightened.

After the adjustment is completed, check with several records to make sure it is correct. Also check with a 12-inch record. If the 10-inch setting was made correctly, the 12-inch should be automatically correct.



BOTTOM VIEW—LESS DRUM DRIVE WHEEL AND REJECT LEVER

TROUBLE

SYMPTOM	CAUSE	REMEDY
Motor failure.	1. Broken wire or defective plug.	
	2. Faulty switch (29).	1. Replace switch.
	3. Faulty linkage between switch and reject lever (34).	
	4. Motor coils open.	1. Replace motor (32).
Motor overheats or is sluggish.	1. Poor lubrication.	1. Oil motor bearings with light machine oil.
	2. Incorrect line voltage or frequency.	
	3. Defective winding.	1. Replace motor.
	4. Mechanical binding.	1. Check changer and motor for mechanical binds.
Rumble in reproduction.	1. Worn rubber rim on idler wheel.	1. Replace idler wheel (23).
	2. Changer and motor not properly floated.	1. Check vibration mountings of motor plate and base plate.
	3. Spindle (6) binding.	1. Oil sparingly if necessary.
Changer cycles continuously.	1. Release bracket (46) not catching drive dog (55).	1. Check spring (45) for correct tension. 2. Drive dog may be bent to improper shape.

TROUBLES—*Continued*

SYMPTOM	CAUSE	REMEDY
Changer fails to cycle properly.	1. Improper detent.	1. Detent bearing (15A) may be disengaged or in "H" detent.
	2. Improper lubrication.	1. Check for gummed or dry bearings.
	3. Trip dog (46A) not being tripped by serrated lever.	1. Check that lever has not been bent up so that the end of it is above the level of the trip dog. 2. Check tension of spring (37).
	4. Drive dog (55) not falling to engage boss on drum (56) when released.	1. Check screw (54) to see that it is giving drive dog sufficient freedom.
	5. Lead through pickup arm from crystal does not have enough slack to allow pickup arm to reach eccentric groove.	1. Pull up lead to allow sufficient slack.
Changer stalls or is jerky during change cycle.	1. Drive belt (57) loose.	1. Replace belt.
	2. Drive belt (57) slipping.	1. Thoroughly clean any oil from belt run on drum (56) and pulley bearing (41). Replace belt.
	3. Friction pad (50) applying too little or too much friction between cam (52) and cam shaft (a part of 28). (Too little friction usually results in jerking and too much in stalling.)	1. By proper bending of the pad more or less friction may be obtained.
Improper landing of pickup arm.	1. Improper adjustment of pickup arm base (15) on pickup arm positioning shaft.	1. Refer to Adjustment of Pickup Arm Positioning.
	2. Detent bearing not in proper detent.	1. Refer to Operating Instructions.
Pickup arm does not clear last record when cycling or does not lower on first.	1. Pickup arm lift lever (a part of 5) may be bent.	1. Straighten carefully to proper bend and check during change cycle and during playing.
	2. Cam (52) and drum assembly (56) riding too low on cam shaft.	1. Check that assembly is correct and secure.
Records do not drop correctly.	1. Spindle free to wobble.	1. Check for worn parts in spindle bearing mounting and replace.
	2. Action of ejector plate (13) not correct.	1. Ejector spring (53) does not have proper tension. 2. Binding of ejector shaft, ejector plate, ejector eccentric. 3. Ejector eccentric (12) has been reassembled backwards.

LUBRICATION

Lubrication applied at the time of manufacture is usually sufficient for several years. However, if the changer is subjected to severe operating conditions it is well to clean and relubricate all moving parts.

The main cam should be heavily lubricated with Lubriplate 105. Use a fine light oil on all other bearing surfaces. Do not allow oil or grease to touch the rubber parts. Do not over-lubricate.

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	RC 198 Astatic Type C	Pickup arm
2	RC 226	Thumb screw, needle
3	RC 199 No. L-40-A Astatic	Crystal pickup cartridge
4	10001-4-4	Screw No. 4-40 x ¼"
5	RC 97	Pickup arm lift assembly
6	RC 82	Spindle assembly
7	RC 163-2	Turntable
8	RC 161	Ejector assembly cap
9	10018-8-3	Set screw No. 8-32 x 3/16"
10	RC 84	Record pressure plate
11	RC 170	Washer, ejector eccentric
12	RC 111	Ejector eccentric
13	RC 107	Ejector plate
14	RC 108	Record support shelf
15	RC 202	Pickup arm support
15A	Part of RC 202	Detent ball bearing assembly
16	10018-8-3	Set screw No. 8-32 x 3/16"
17	RC 158	Spring, record pressure plate
18	Not used	Washer
19	RC 219	Control knob
20	R-1063	Clip, "C" type
21	RC 229	Hairpin clip
22	RC 230	Felt washer
23	RC 231	Idler wheel
24	RC 123	Turntable bearing
25	10023-6-12	Screw 6-32 x ¾"
26	RC 197	Washer
27	RC 196	Spacer
28	RC 99	Base plate assembly
29	RC 148	Switch
30	RC 189	Mounting grommet
31	RC 233	Tension spring, idler wheel

Ref. No.	Part No.	DESCRIPTION
32*	RC 106	Motor assembly—General Industries Co. No. 13395
33	RC 92	Index shaft and cam
34	RC 104	Reject lever
35	RC 86	Index lever
36	RC 156	Index spring
37	RC 153-2	Spring, pickup arm lead-in
38	RC 98	Control knob shaft assembly
39	Not used	Washer—obsolete
40	RC 93	Pickup arm positioning shaft assembly
40A	RC 93 Same Assembly	Follower stud
41	RC 221	Pulley bearing
42	10079-1	Cotter pin
43	RC 145	Washer
44	RC 131	Ball-bearing race and retainer
45	RC 153	Spring, release bracket
46	RC 88	Release bracket assembly
46A	Part of RC 88	
47	RC 144	Washer
48	RC 150	Hairpin clip
49	RC 89	Ejector shaft assembly
50	RC 184	Shim—cam drag
51	Part of RC 89	Ejector roller
52	RC 102	Cam assembly
53	RC 155	Ejector spring
54	10005-4-4	Binder head screw No. 4 x ¼"
55	RC 116	Dog, cam assembly
56	RC 85	Drum drive wheel
57	RC 141	Belt, drive
58	10056-2	Washer
59	RC 212	Bearing support bar
60	RC 175	Tinnerman nut
61	10051-10	Split ring washer
62	10031-10	Nut
63	RC 176	Tinnerman nut

*RC 210—Motor Pulley 50 cycles